

# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
009450669-02	OBS	No	478.087940	234.703569	3454.2	12.306	17.3	9.5	0.59	4866	3.94	0.17
009450669-03	OBS	No	308.327828	374.263208	2327.8	5.229	18.0	9.1	0.59	4866	4.63	0.32
009450669-04	OBS	No	545.110344	236.416352	3176.8	4.963	17.3	11.3	0.59	4866	3.68	0.15
009450669-05	OBS	No	639.970752	177.323963	2264.6	4.765	16.7	7.6	0.59	4866	2.90	0.12
009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009450669-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT— CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

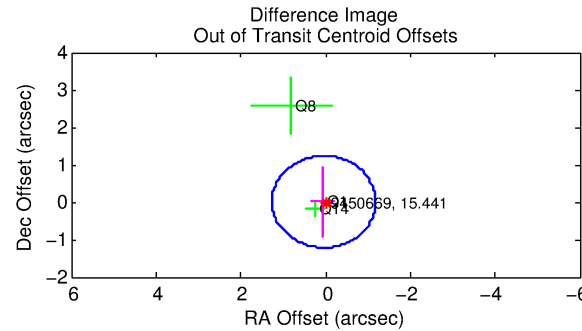
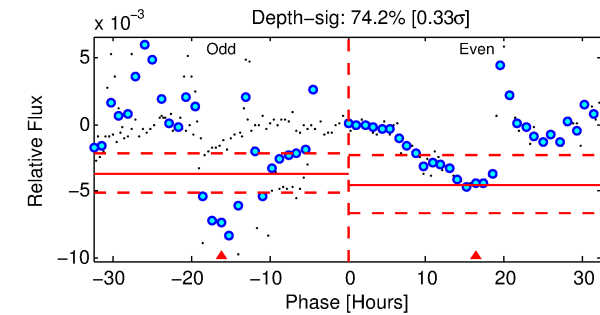
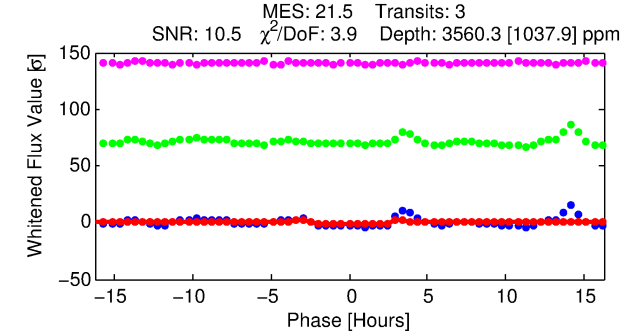
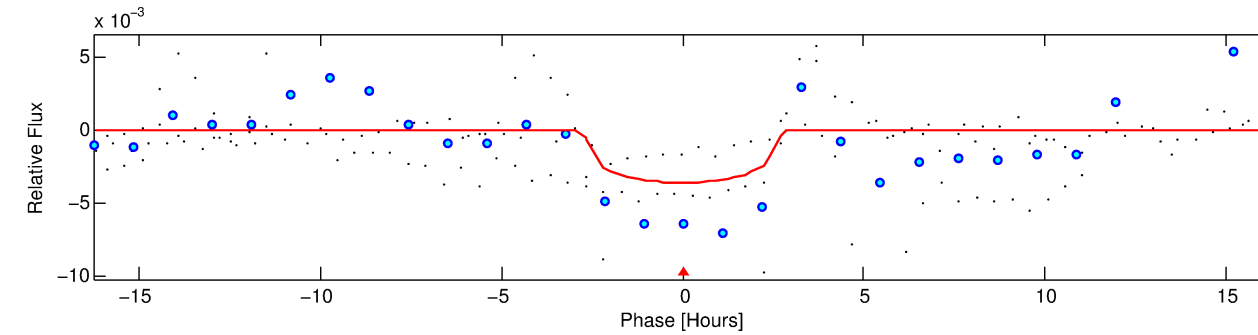
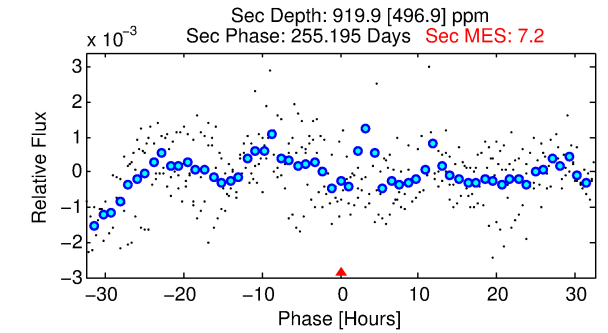
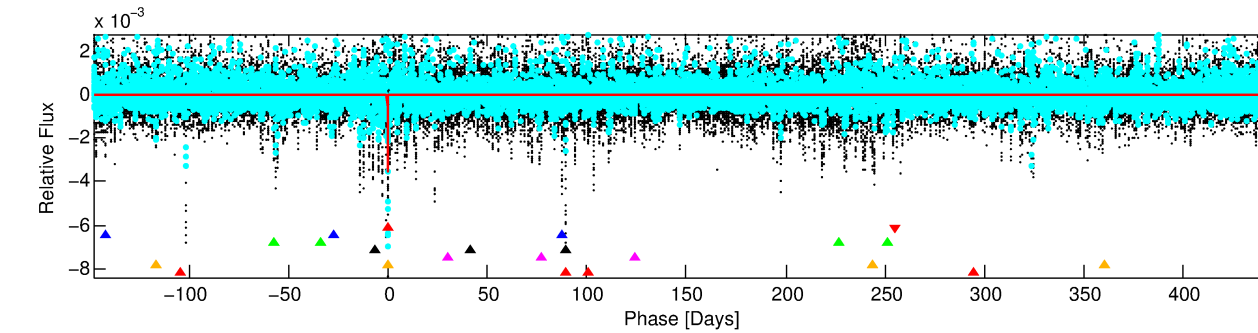
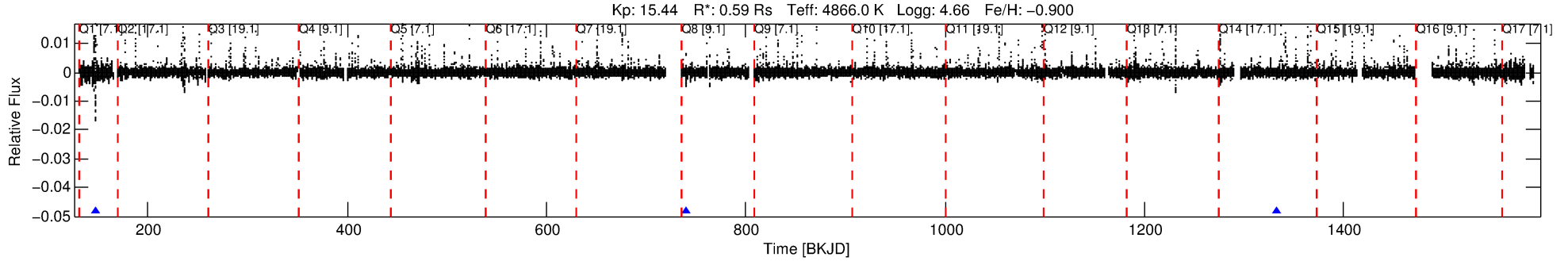
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Ephemeris Match Information For 009450669-01

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 1 of 7 Period: 592.878 d



## DV Fit Results:

Period = 592.87788 [0.00923] d  
Epoch = 147.0311 [0.0142] BKJD  
Rp/R\* = 0.0533 [0.0975]  
a/R\* = 878.53 [5904.84]  
b = 0.00 [2356.43]  
Seff = 0.13 [0.02]  
Teq = 154 [6] K  
Rp = 3.45 [6.32] Re  
a = 1.1580 [0.0788] AU  
Ag = 56966.71 [210704.53] [0.27σ]  
Teffp = 3669 [3394] K [1.04σ]

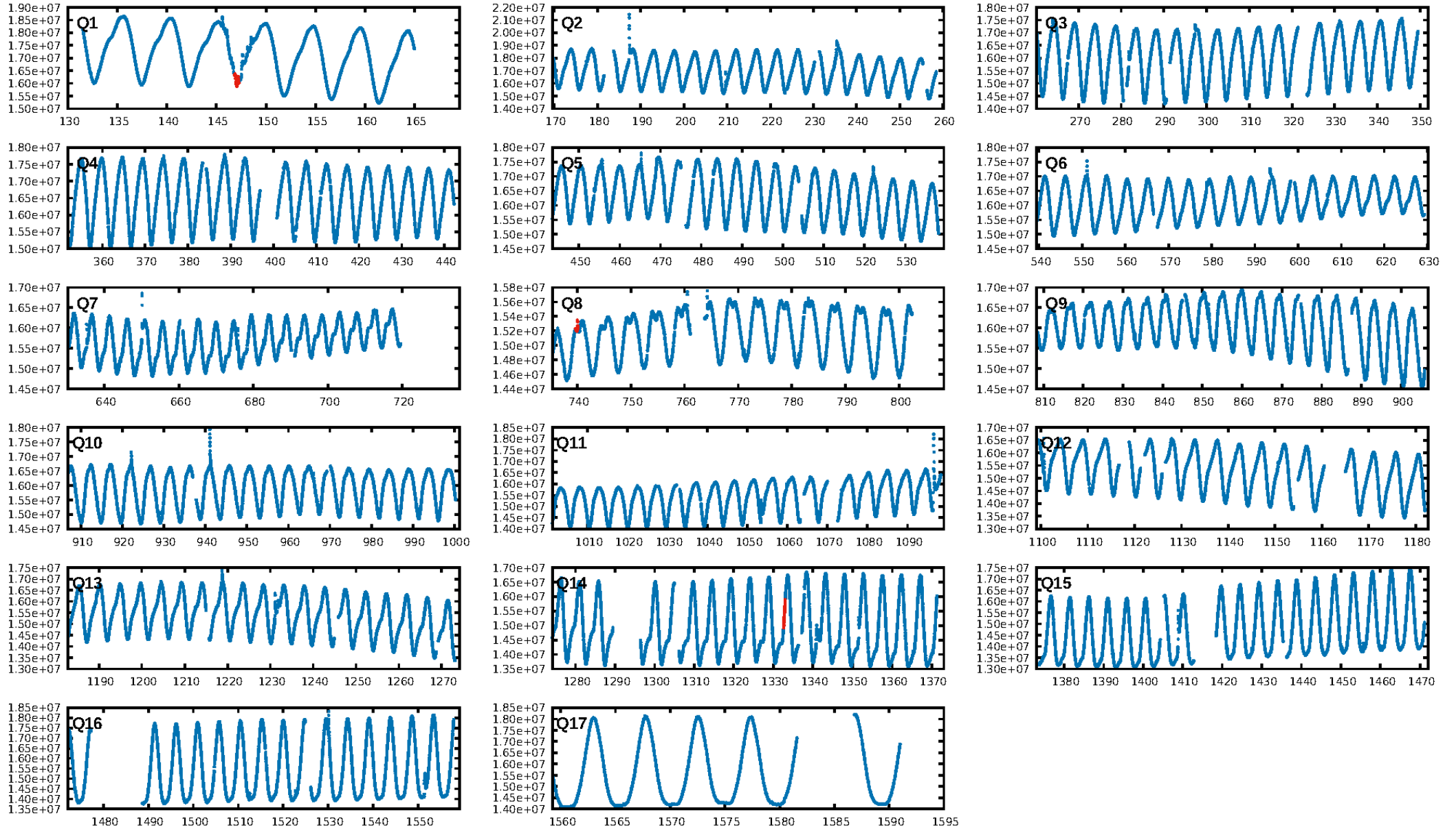
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [155.84σ]  
LongPeriod-sig: 100.0% [156.44σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.109  
Centroid-sig: 60.6%  
Centroid-so: 0.201 arcsec [0.65σ]  
OotOffset-rm: 0.046 arcsec [0.11σ]  
KicOffset-rm: 0.053 arcsec [0.08σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

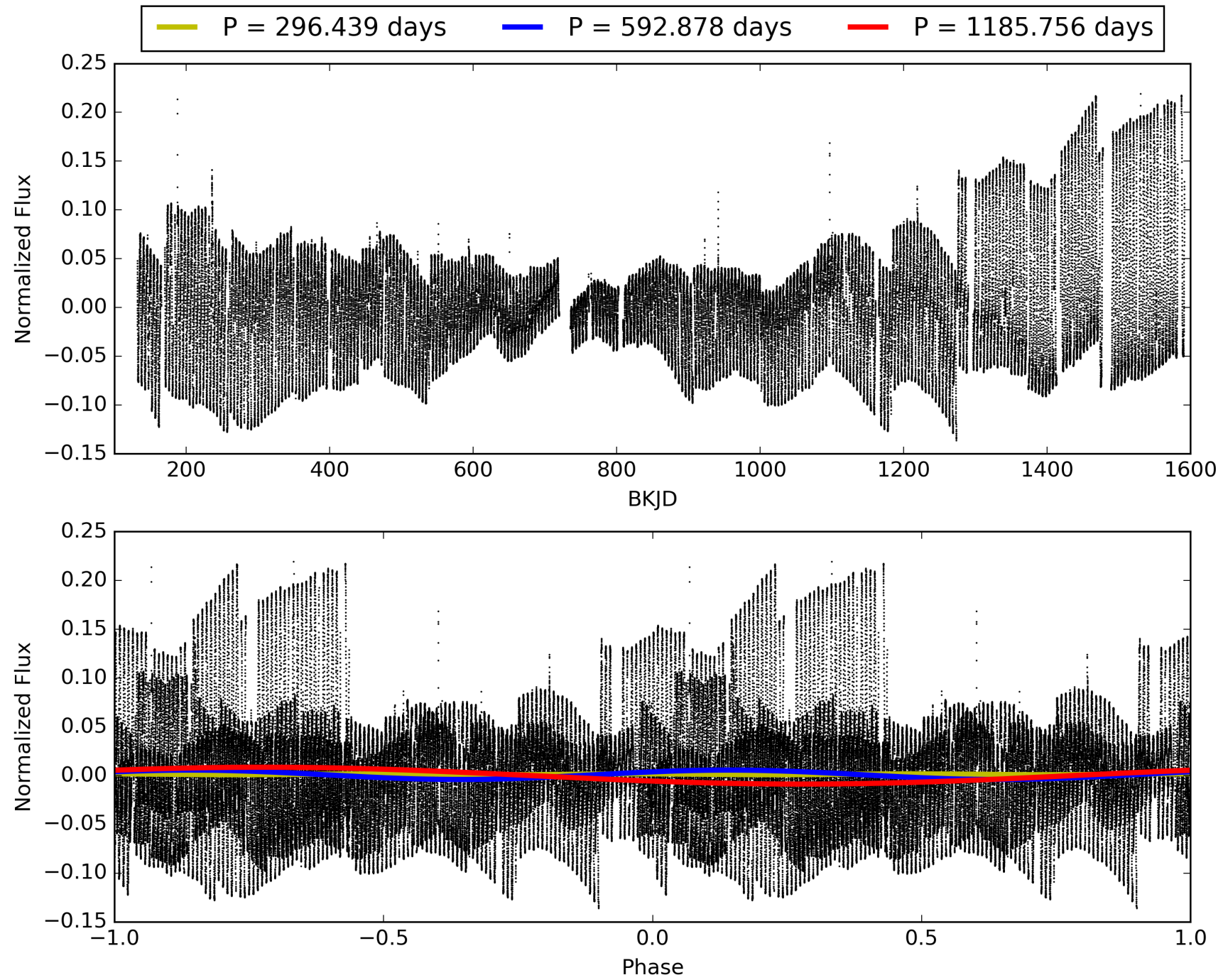
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009450669-01, PDC Light Curves



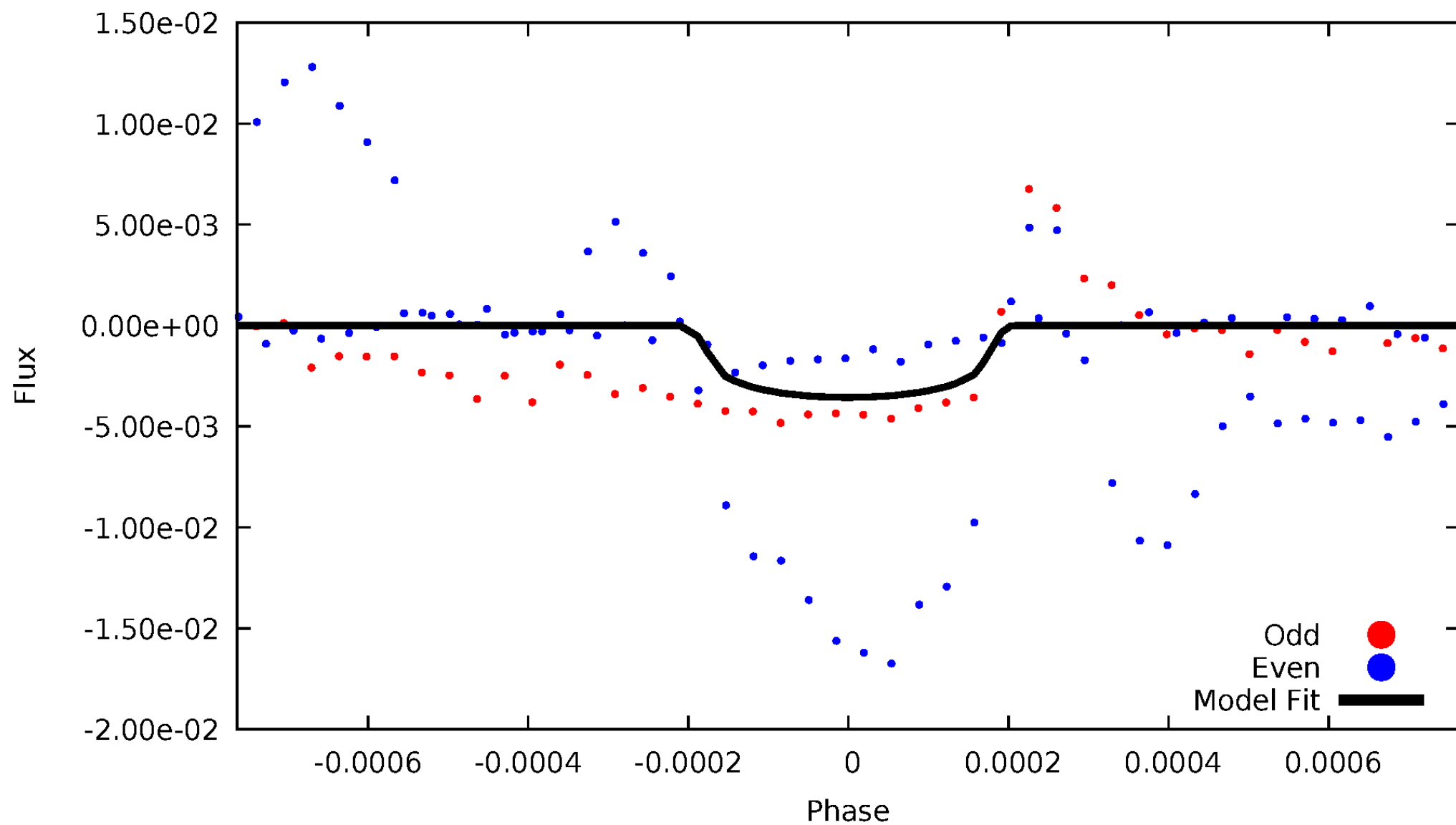
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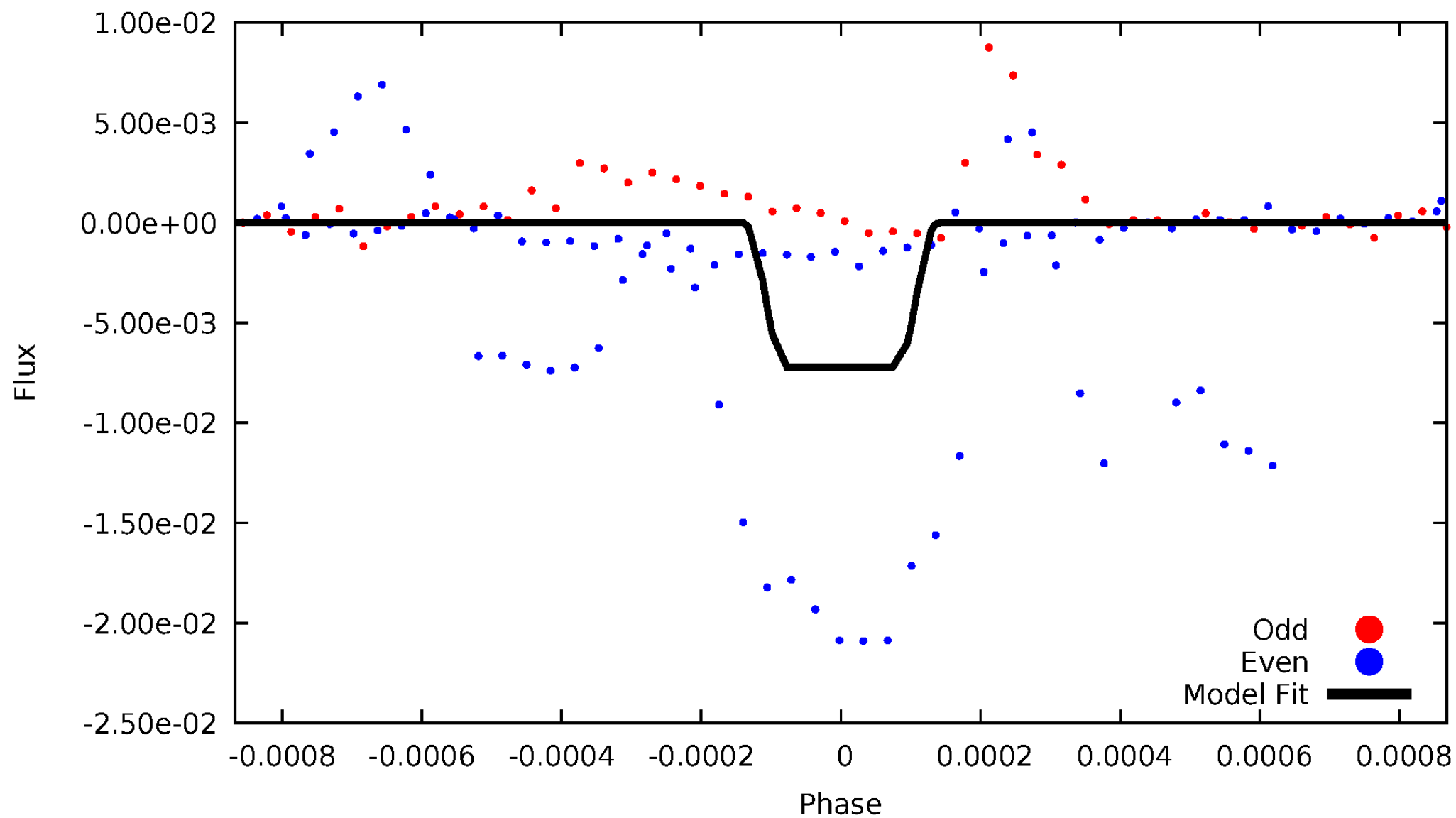
# DV Odd/Even

TCE 009450669-01



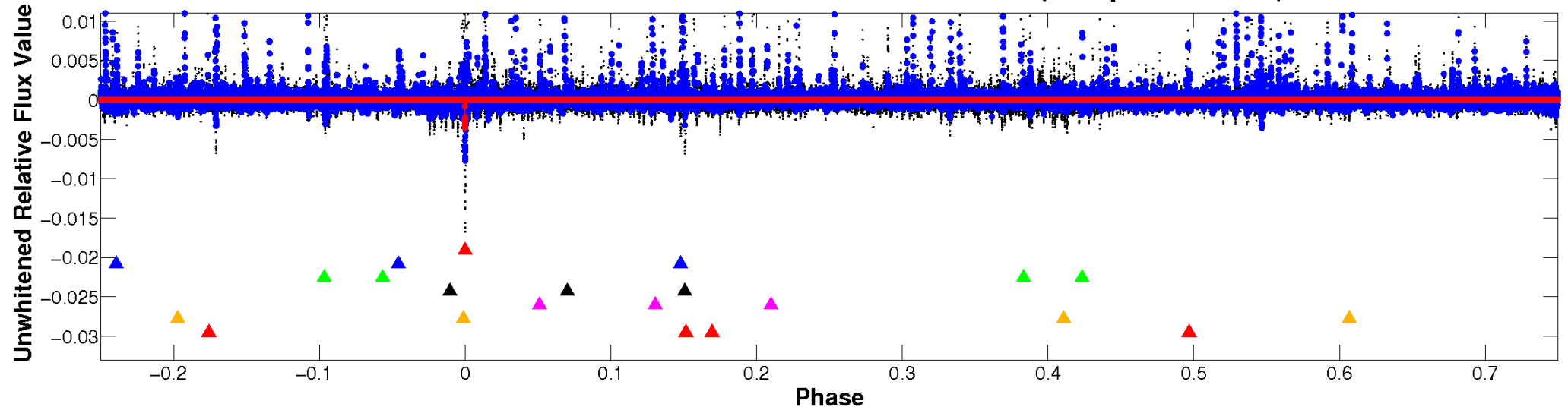
# ALT Odd/Even

TCE 009450669-01

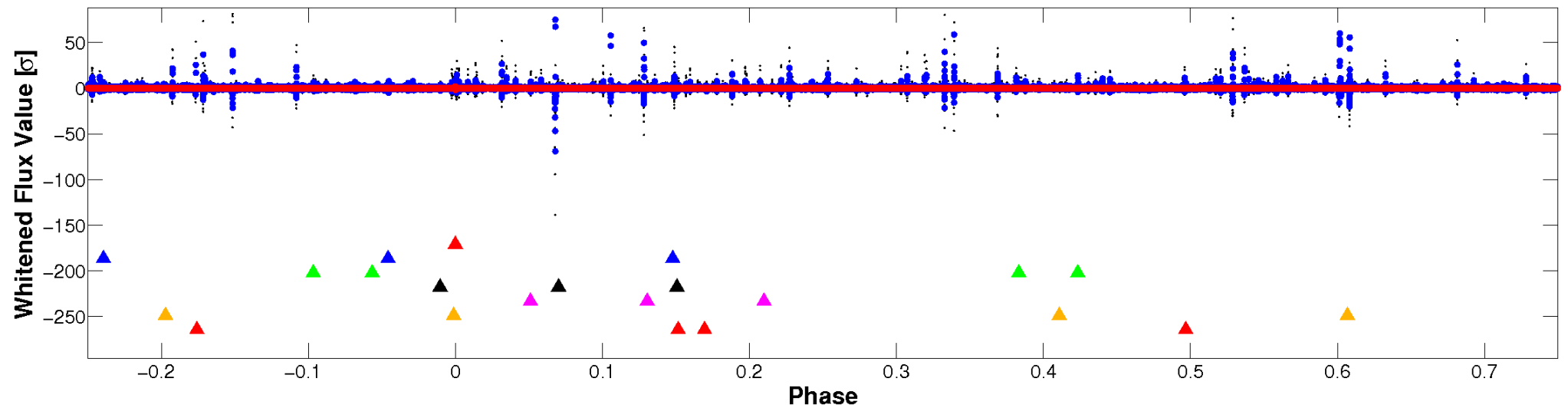


# Non-Whitened Vs. Whitened Light Curve

## Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

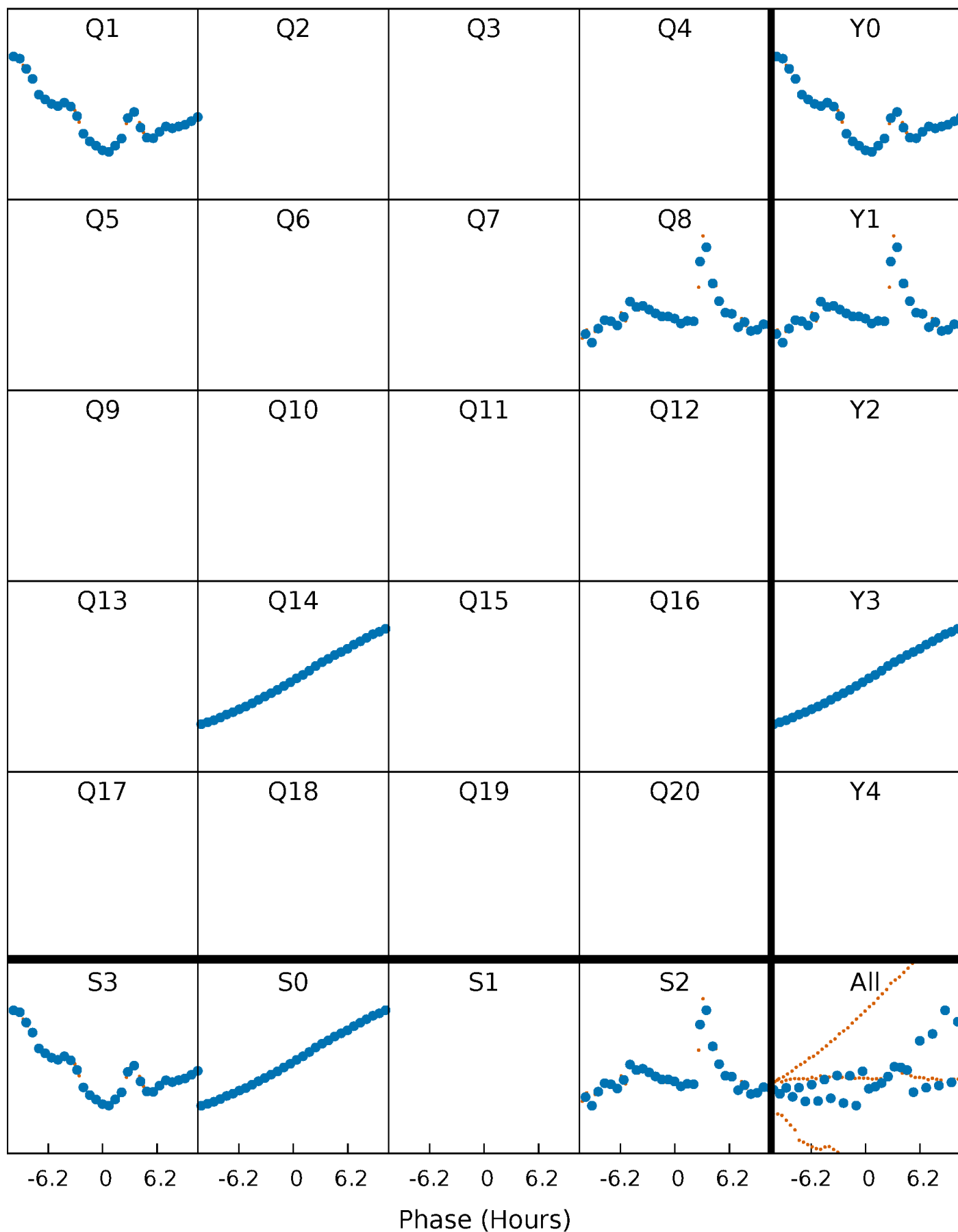


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

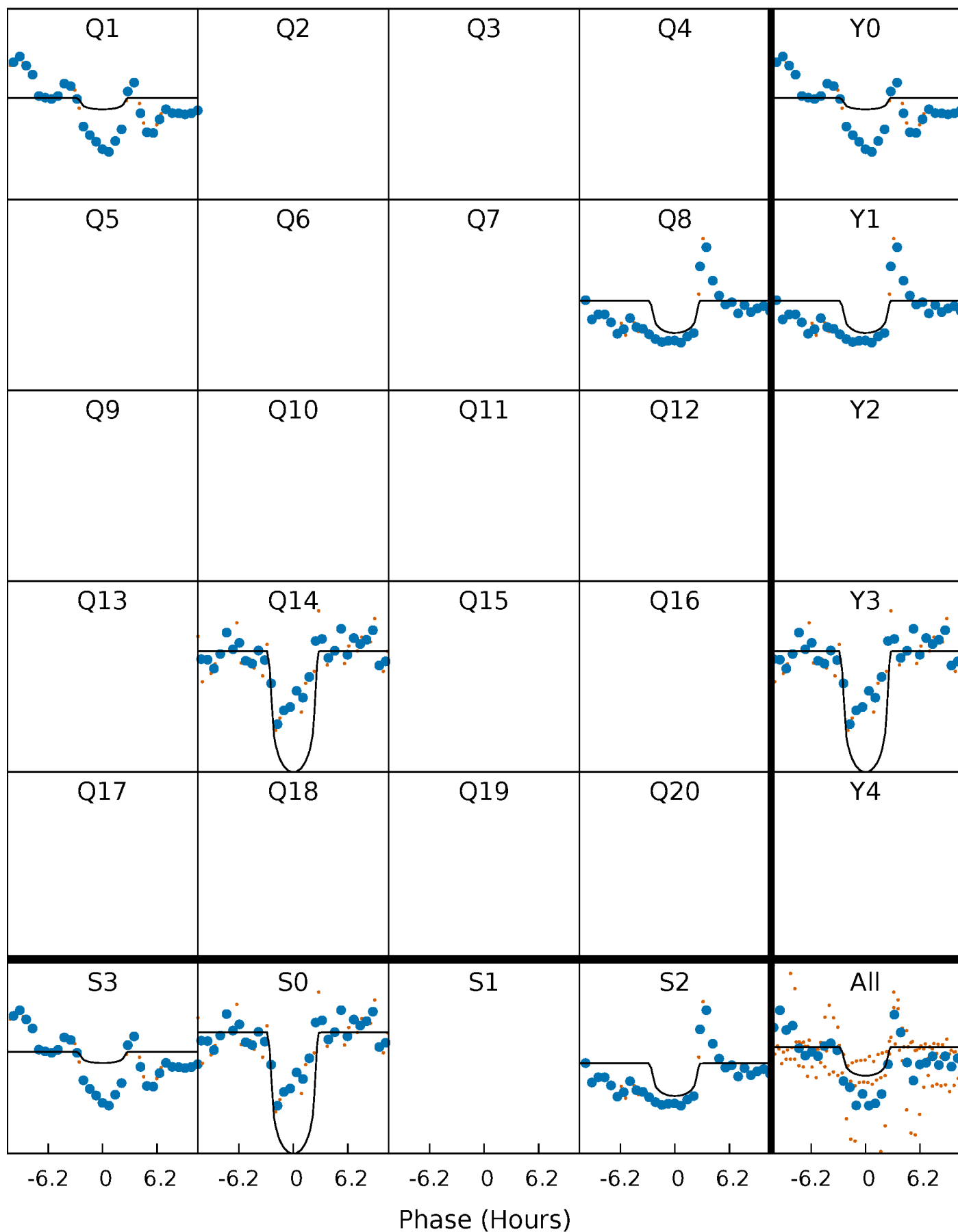
TCE 009450669-01 P=592.877880 Days  $T_0=147.031117$  (BKJD)





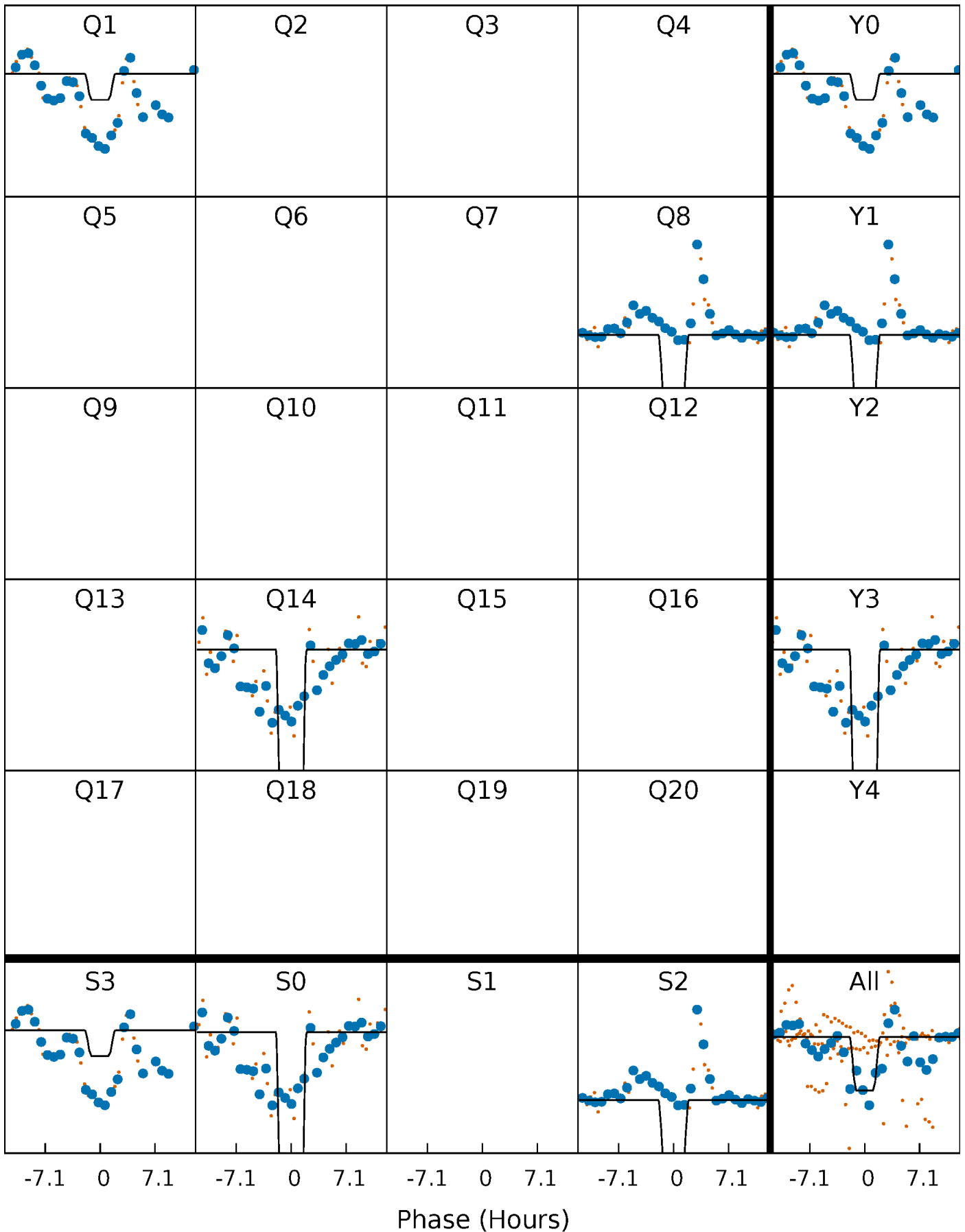
# DV Quarter-Phased Transit Curves

TCE 009450669-01 P=592.877880 Days  $T_0=147.031117$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

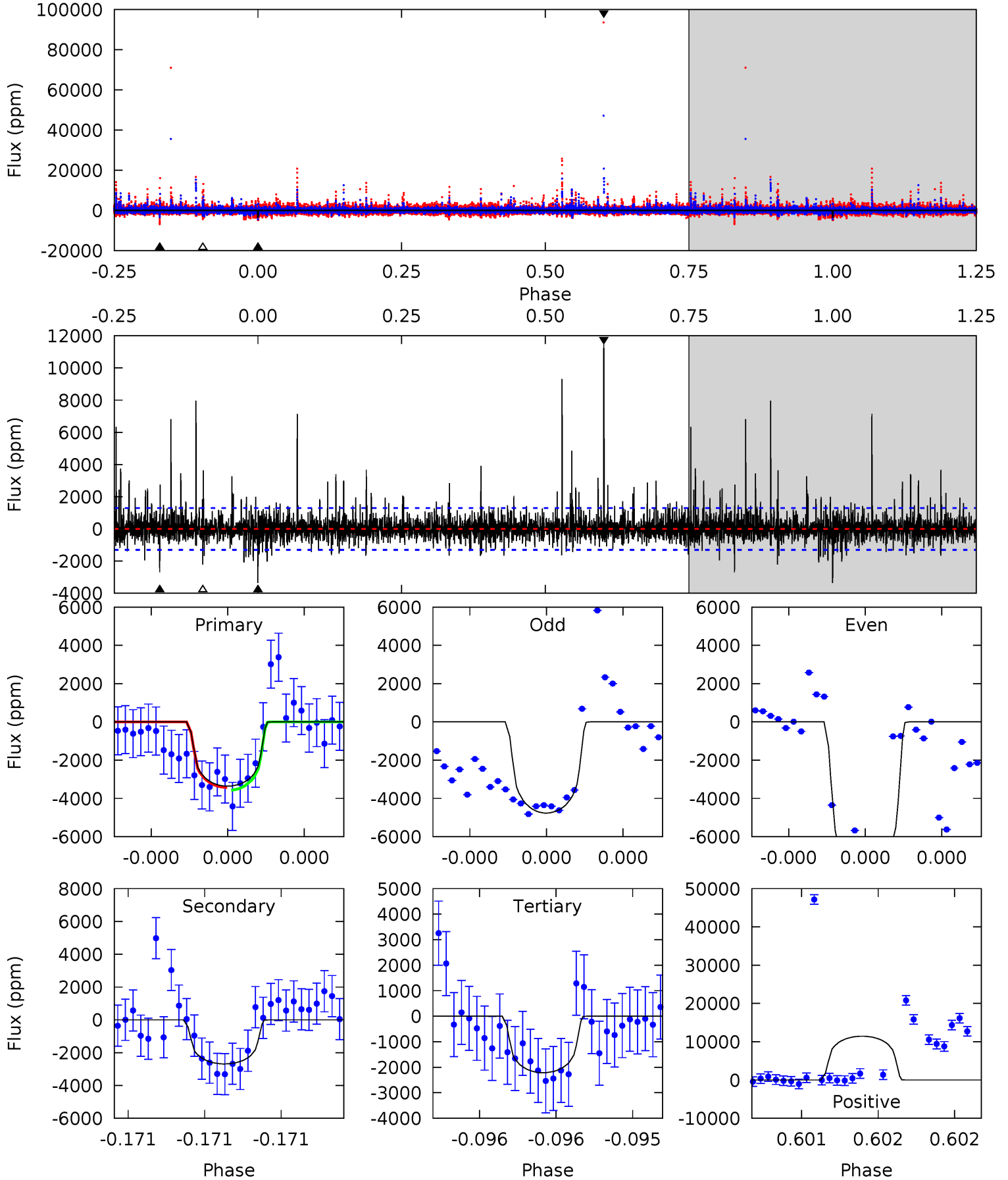
TCE 009450669-01 P=592.893366 Days  $T_0=147.023501$  (BKJD)



# DV Model-Shift Uniqueness Test

009450669-01, P = 592.877880 Days, E = 147.031117 Days

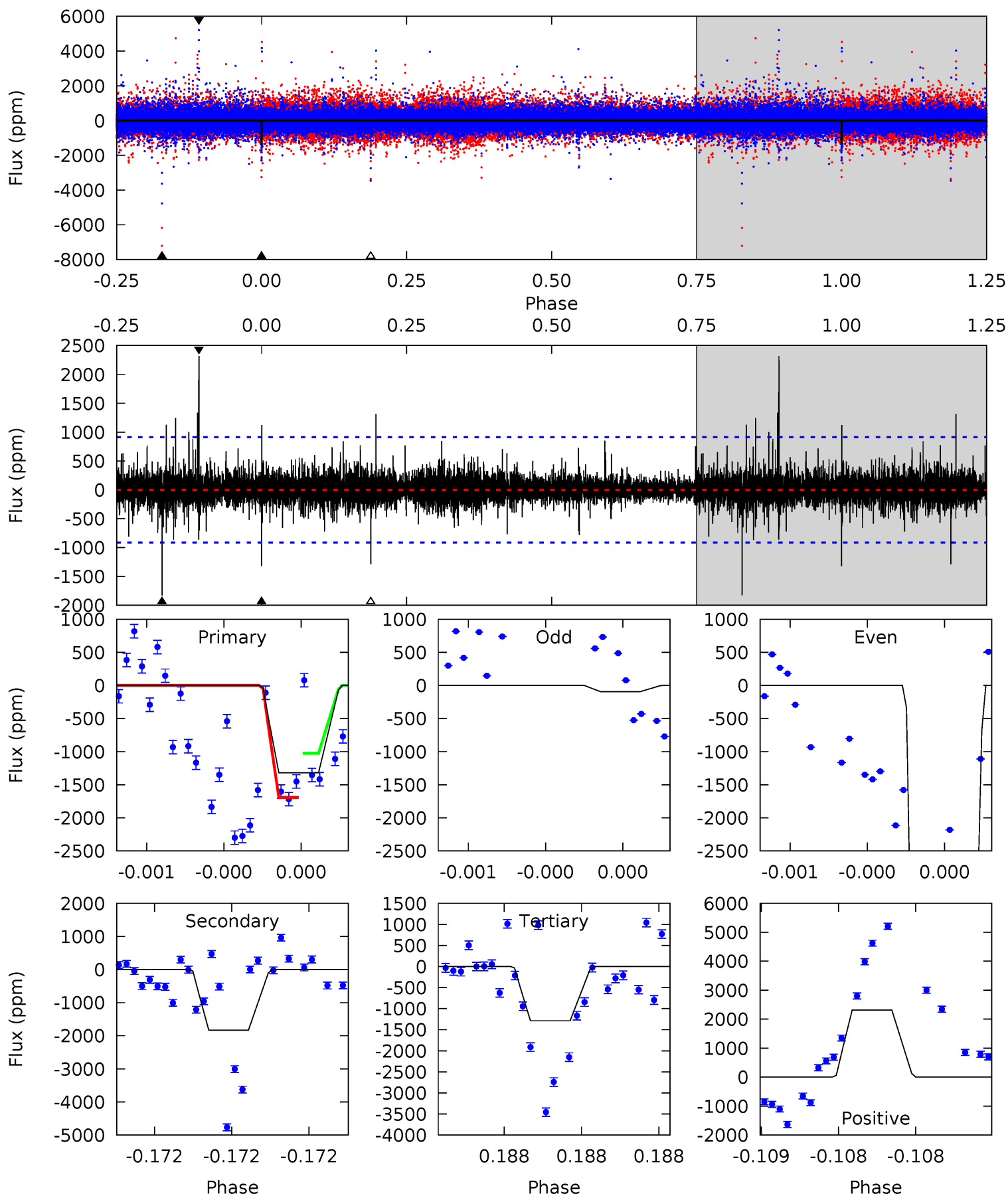
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.6	11.6	9.60	49.6	5.62	3.55	2.67	4.96	-35.1	2.04	-38.0	3.94	1.48	0.77	0.31



# Alt Model-Shift Uniqueness Test

009450669-01, P = 592.893366 Days, E = 147.023501 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.20	11.4	8.00	14.4	5.68	3.64	0.87	0.21	-6.19	3.38	-3.02	46.8	4.39	0.56	0





### Stellar Parameters For KIC 009450669

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-2686 \pm 231$	$5.48^{+5.44}_{-3.74}$	$214^{+8}_{-8}$	$4045^{+2666}_{-799}$	$68218^{+581301}_{-51210}$
Alt.	$-1829 \pm 161$	$7.00^{+5.32}_{-4.48}$	$214^{+8}_{-7}$	$3474^{+1633}_{-530}$	$27205^{+185385}_{-18421}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

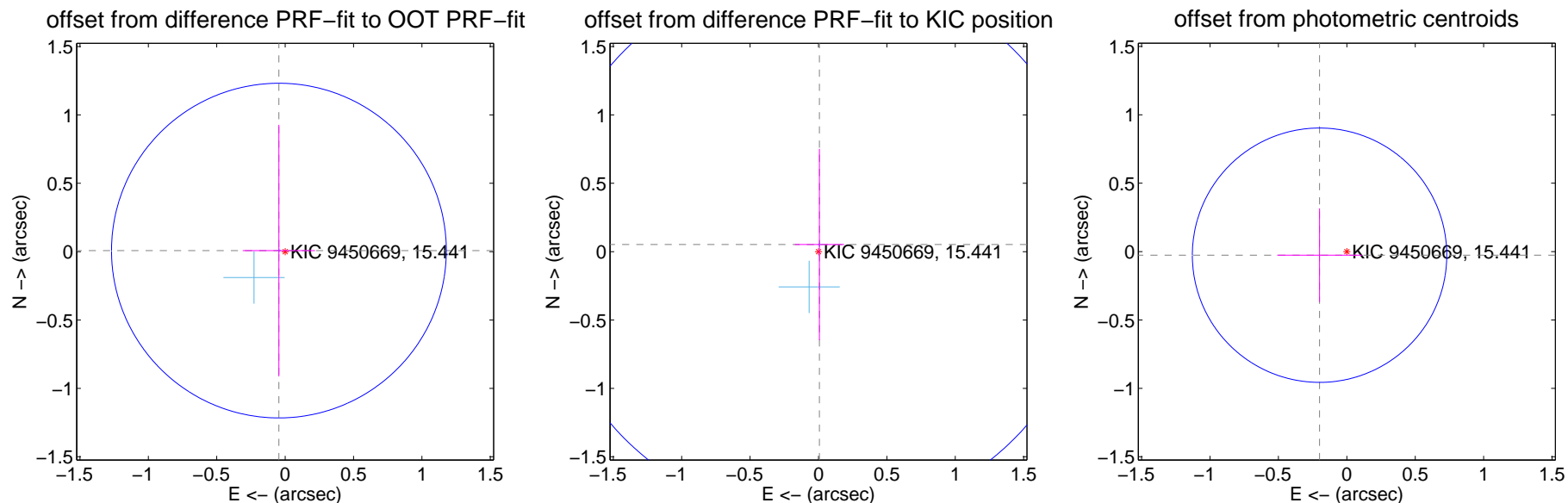
## DV Centroid Data

Supplemental centroid analysis for 009450669-01. Kepler magnitude: 15.44. Transit SNR 10.48

There are 2 quarters with good PRF difference image offsets

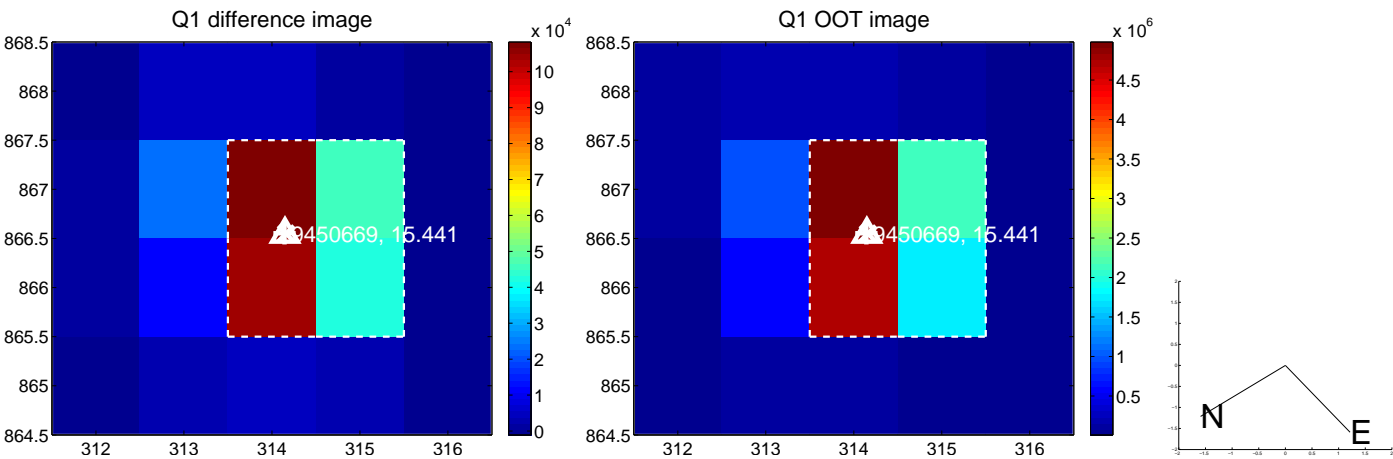
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.046 \pm 0.408$	0.11	$0.046 \pm 0.264$	$0.008 \pm 0.920$
PRF-fit source offset from KIC position	$0.053 \pm 0.670$	0.08	$-0.007 \pm 0.180$	$0.052 \pm 0.699$
photometric centroid source offset	$0.20 \pm 0.31$	0.65	$0.20 \pm 0.31$	$-0.03 \pm 0.34$

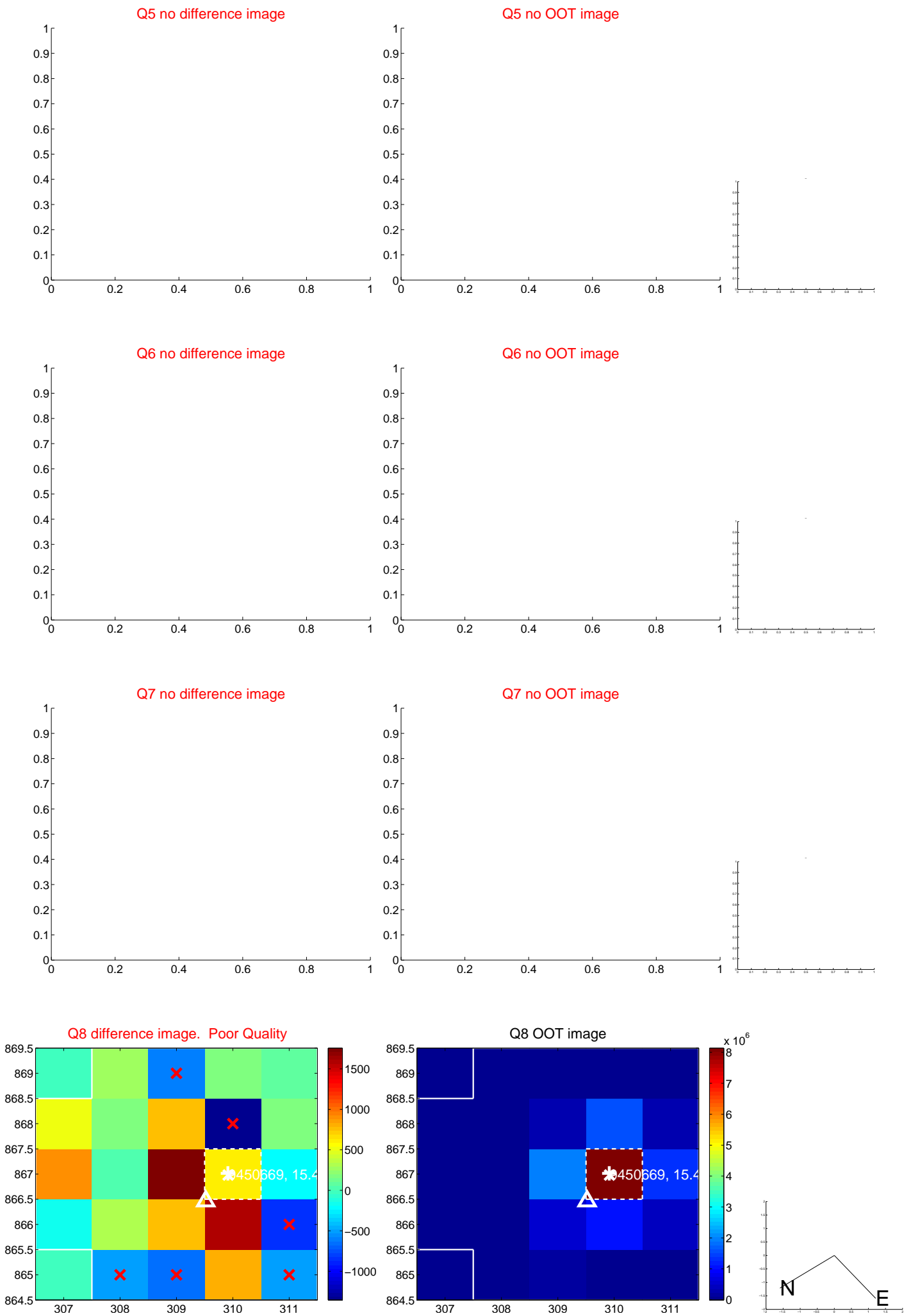


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

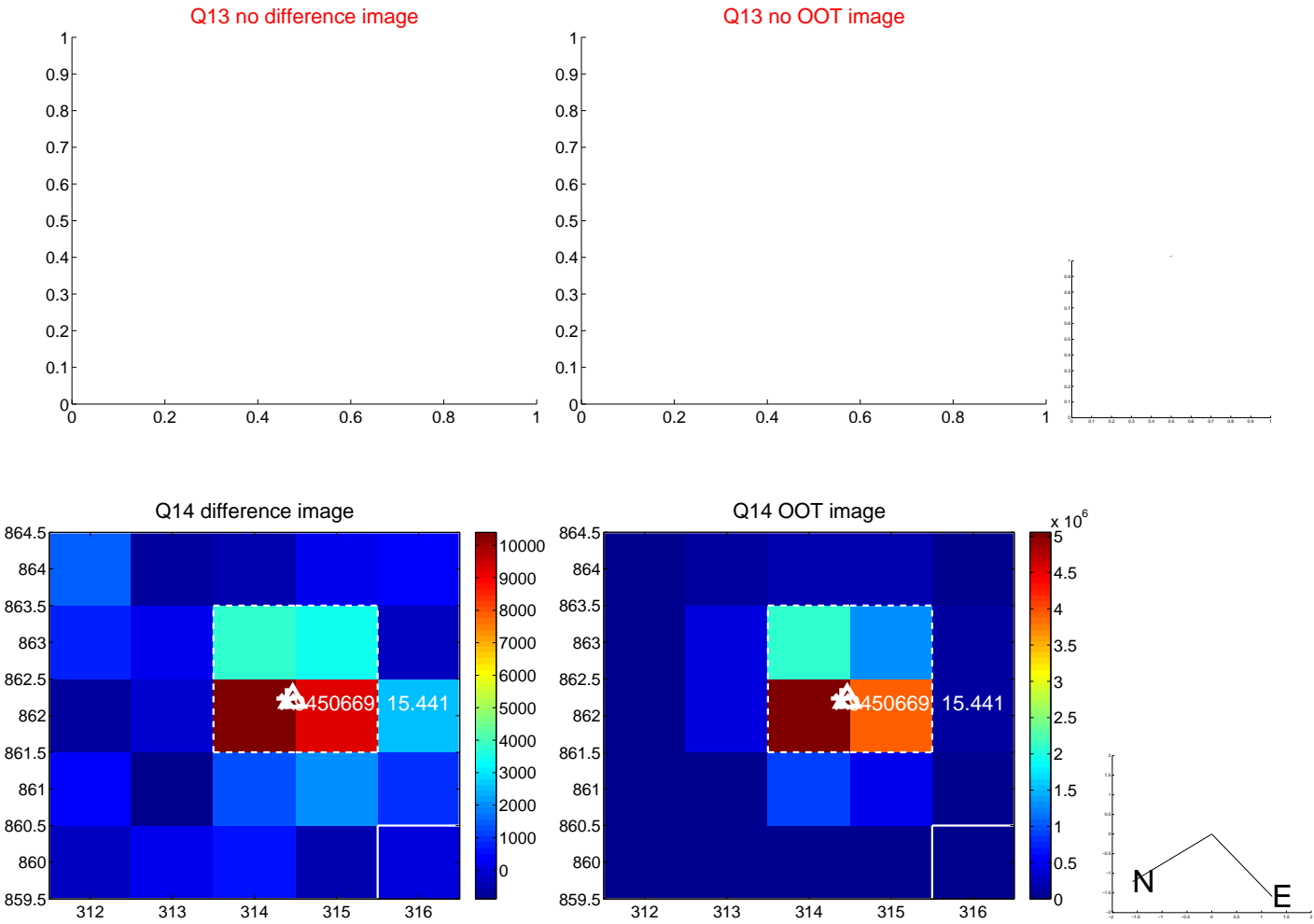




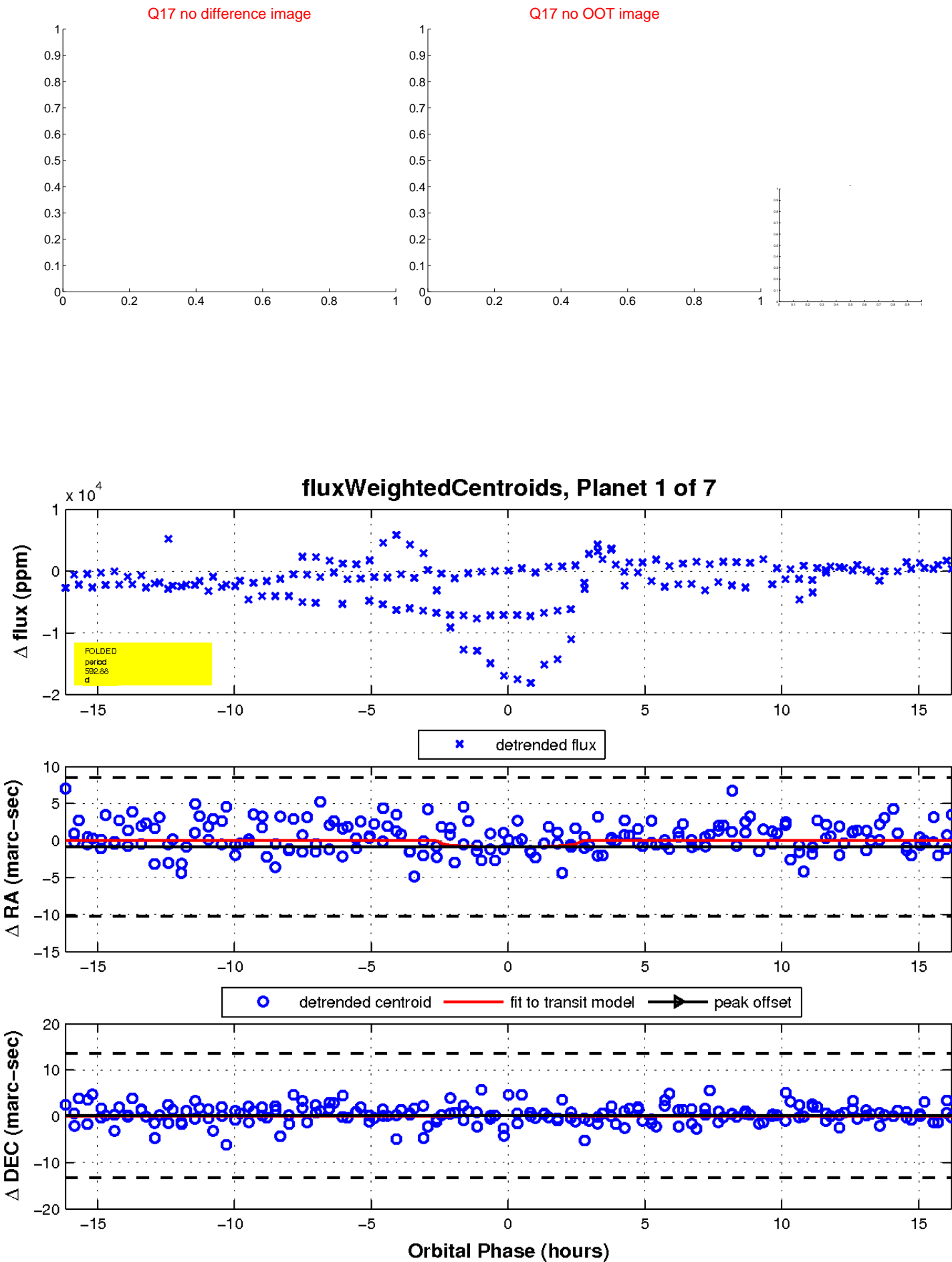
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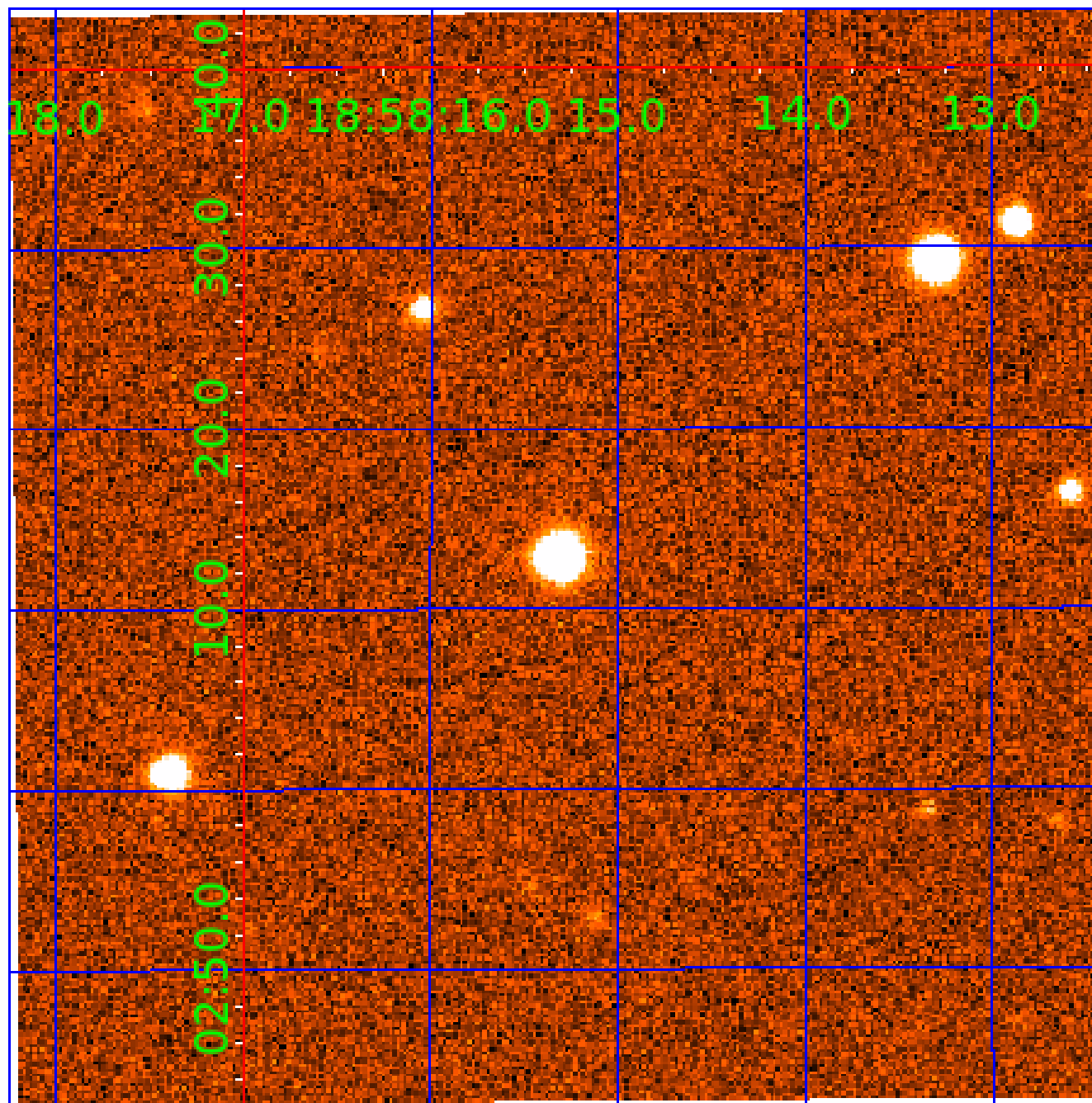


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
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009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT— CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

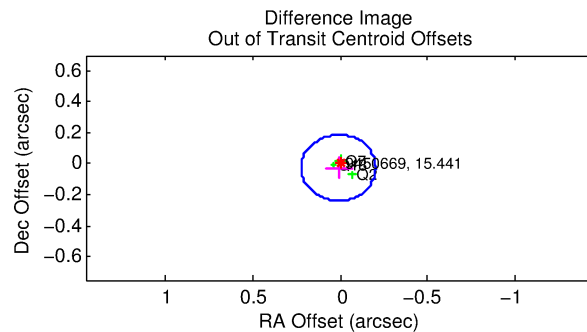
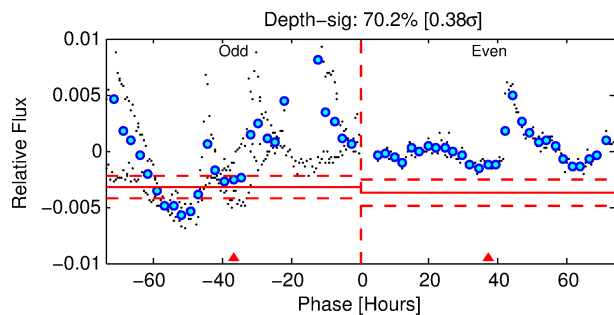
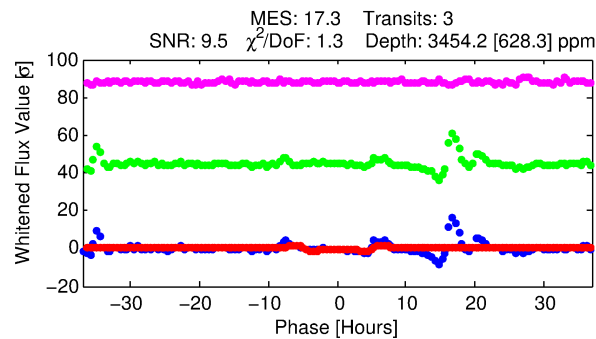
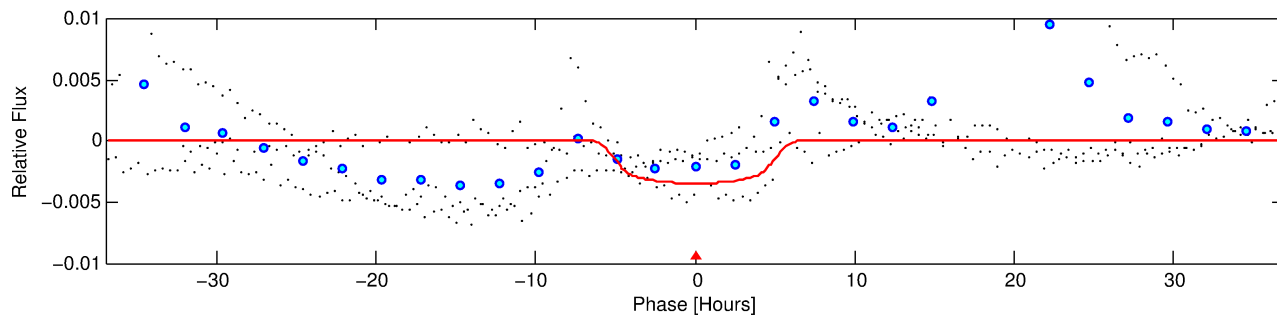
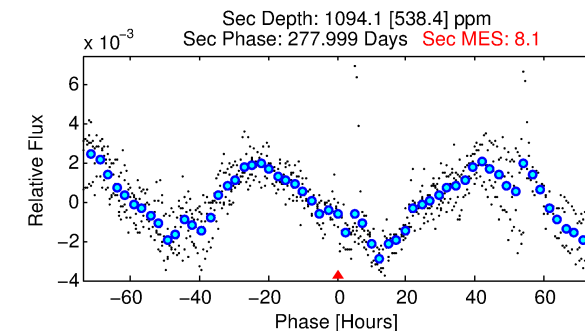
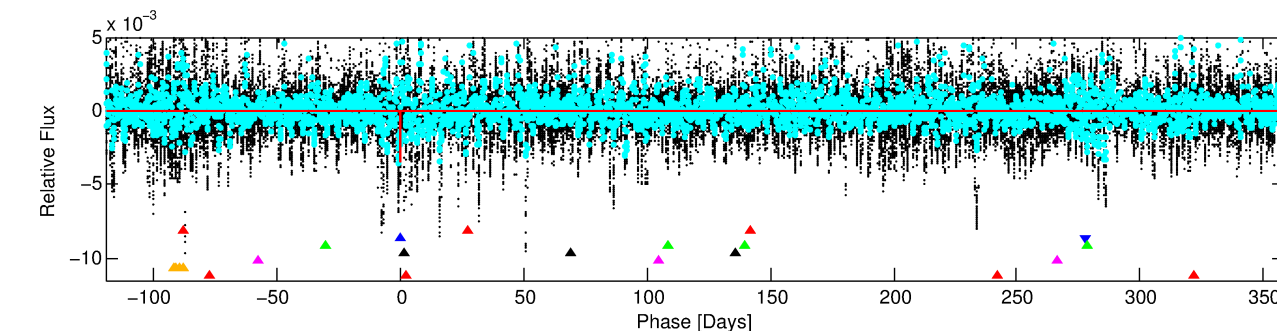
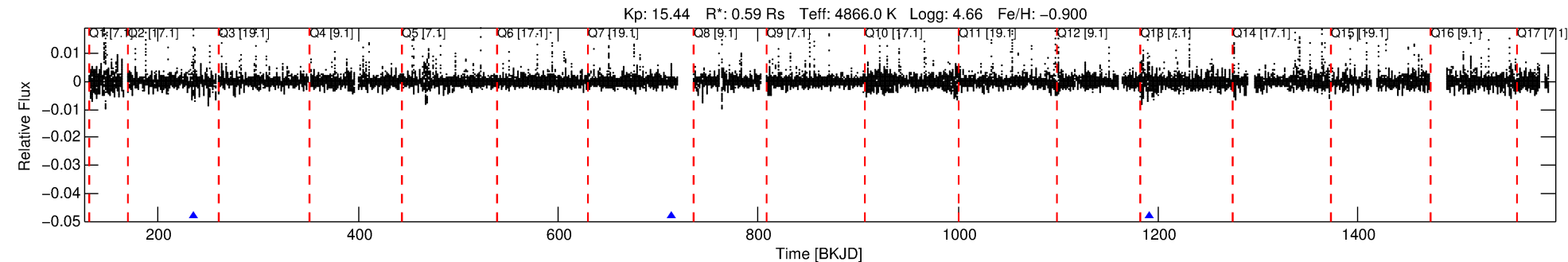
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## Ephemeris Match Information For 009450669-02

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 2 of 7 Period: 478.088 d



## DV Fit Results:

Period = 478.08794 [0.01049] d  
Epoch = 234.7036 [0.0142] BKJD  
Rp/R\* = 0.0609 [0.0069]  
a/R\* = 199.47 [36.94]  
b = 0.82 [0.08]  
Seff = 0.18 [0.03]  
Teq = 165 [7] K  
Rp = 3.94 [0.55] Re  
a = 1.0032 [0.0682] AU  
Ag = 38991.75 [21460.45] [1.82 $\sigma$ ]  
**Teffp = 3586 [500] K [6.84 $\sigma$ ]**

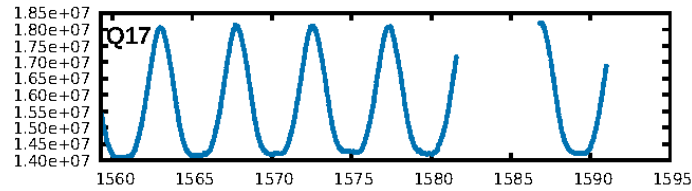
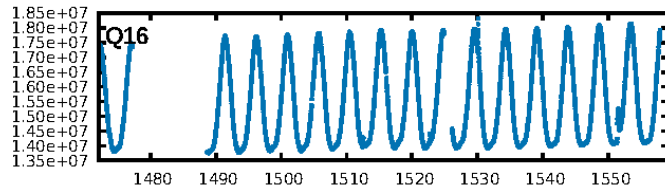
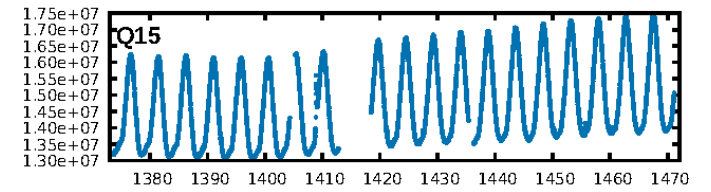
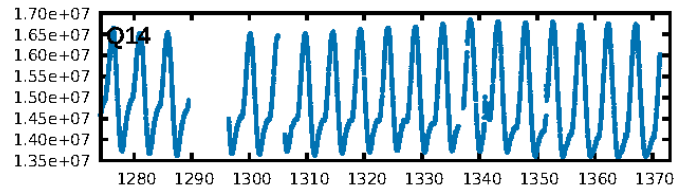
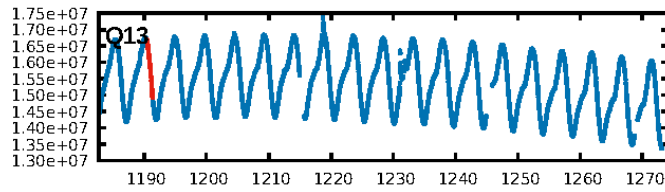
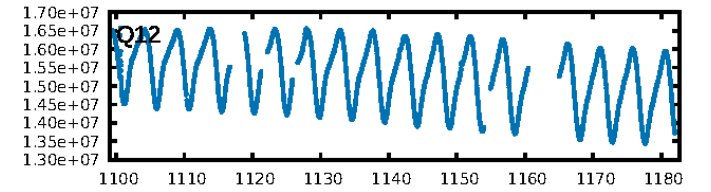
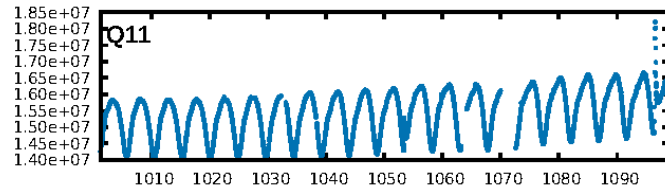
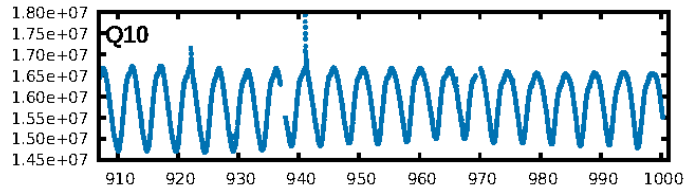
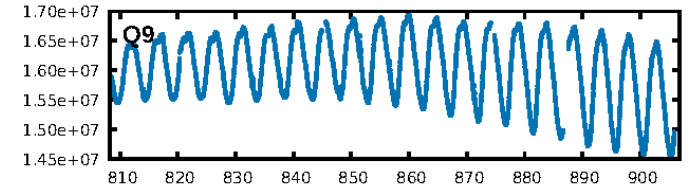
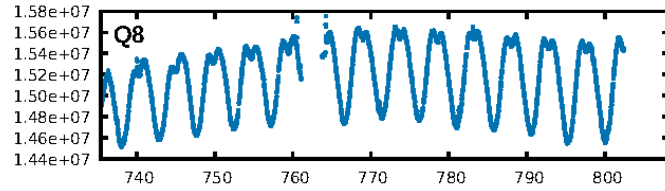
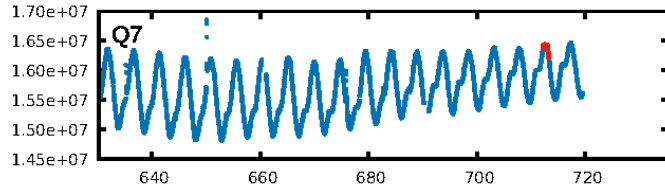
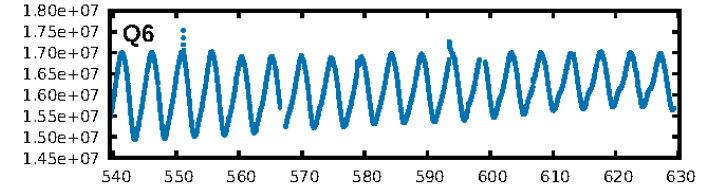
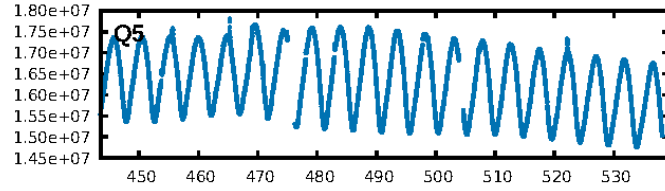
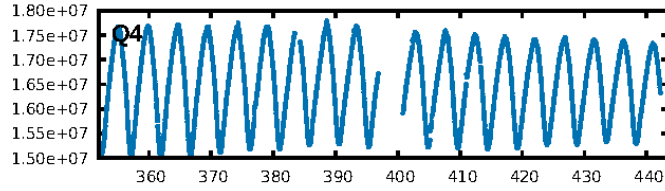
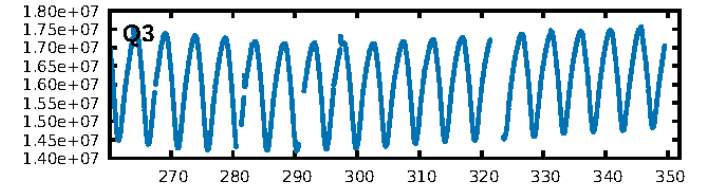
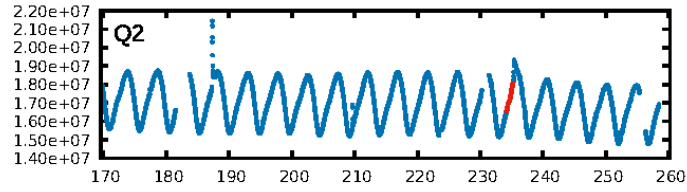
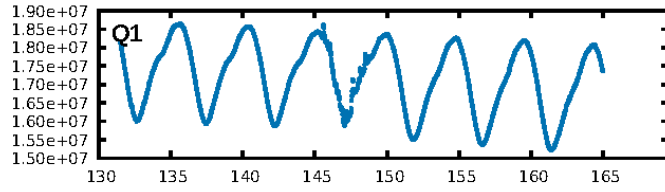
## DV Diagnostic Results:

ShortPeriod-sig: 96.7% [2.13 $\sigma$ ]  
LongPeriod-sig: 100.0% [121.23 $\sigma$ ]  
ModelChiSquare2-sig: 4.5%  
ModelChiSquareGof-sig: 77.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -2.595**  
Centroid-sig: 47.1%  
Centroid-so: 0.285 arcsec [0.83 $\sigma$ ]  
OotOffset-rm: 0.028 arcsec [0.39 $\sigma$ ]  
KicOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

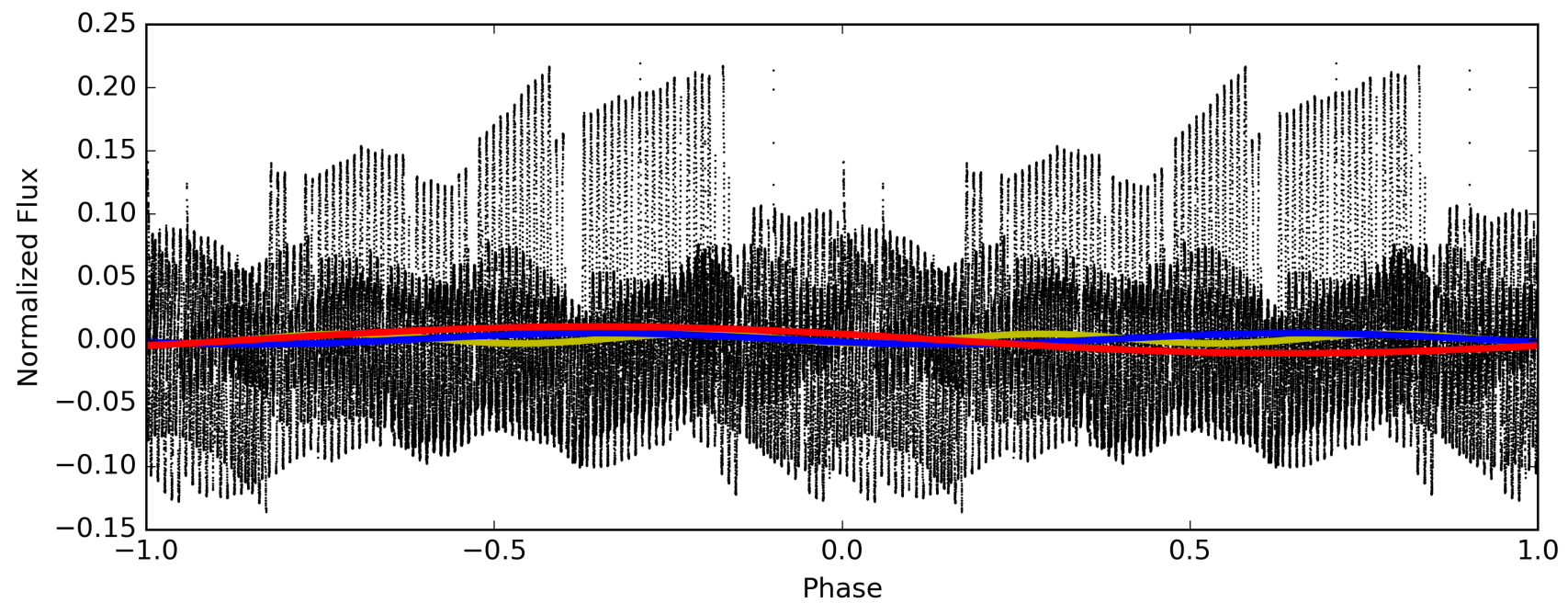
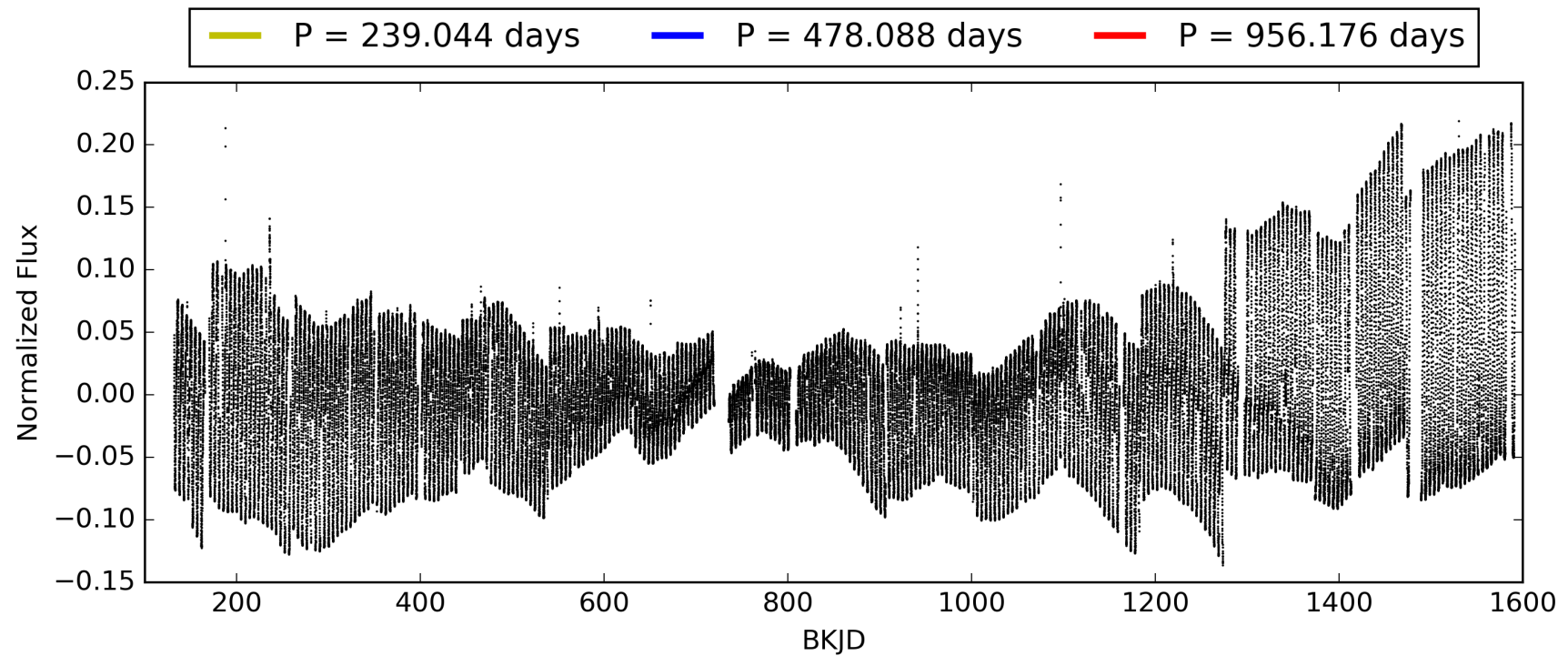
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:44:38 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009450669-02, PDC Light Curves

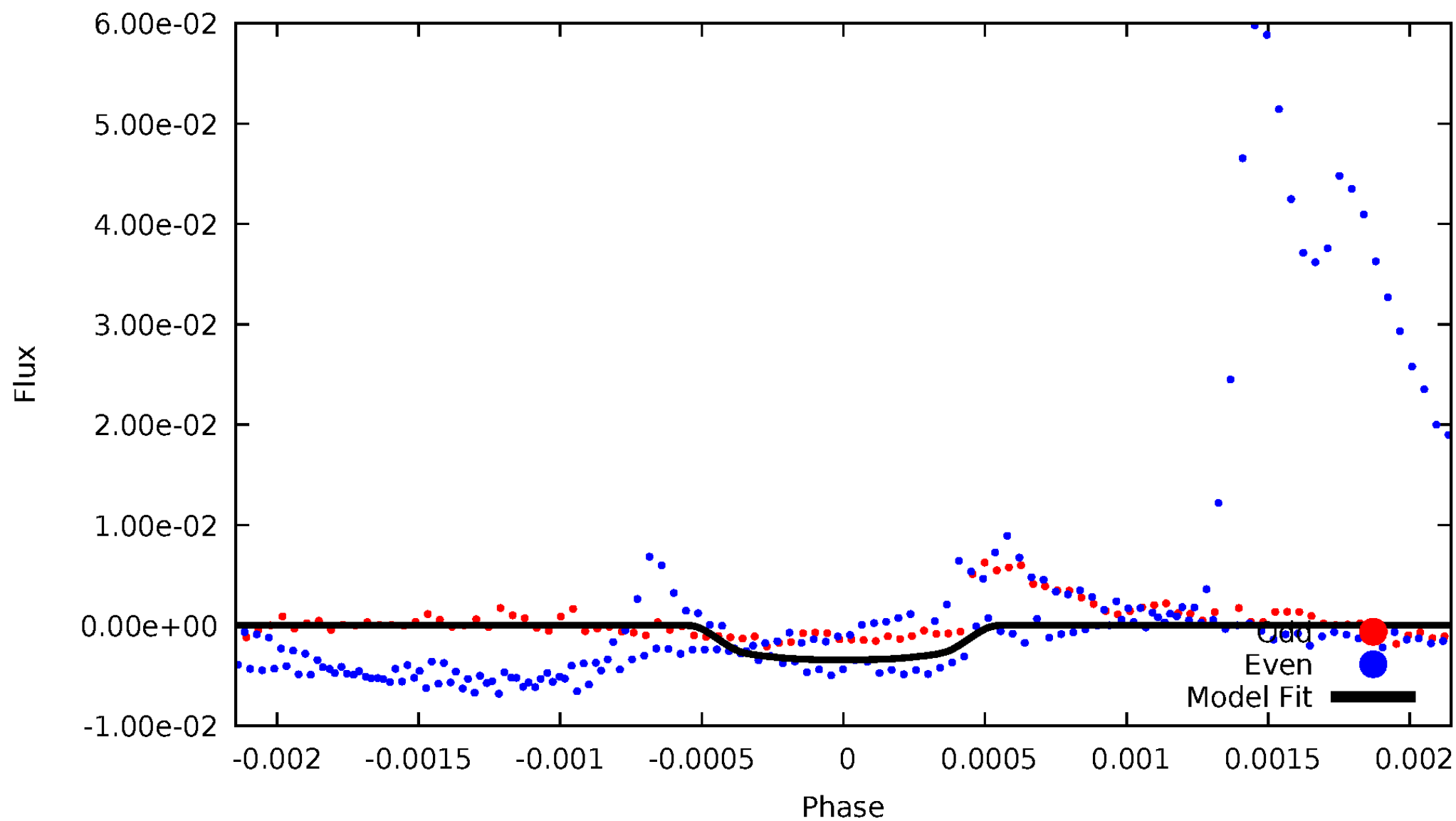


TCE 009450669-02



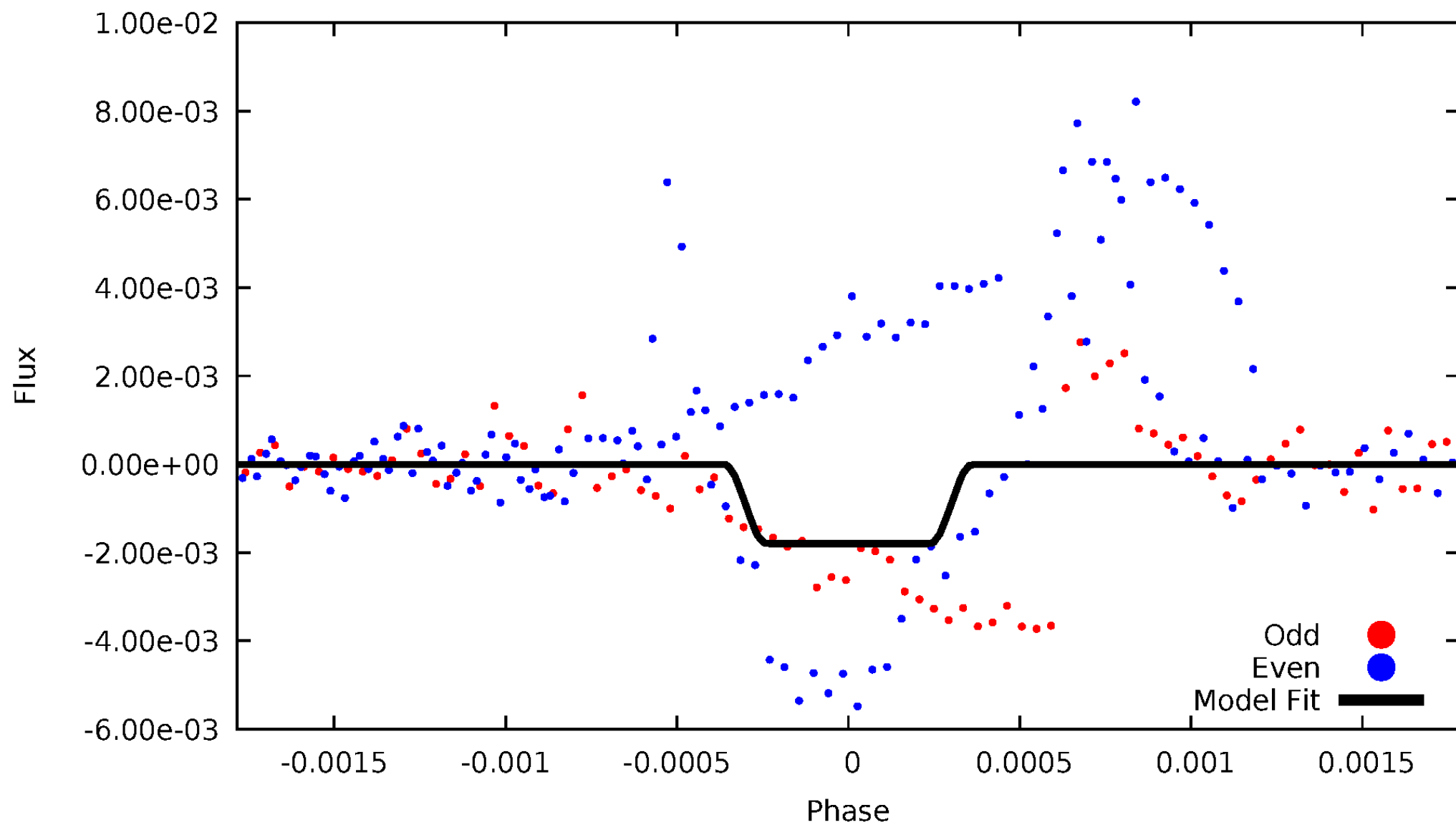
# DV Odd/Even

TCE 009450669-02



# ALT Odd/Even

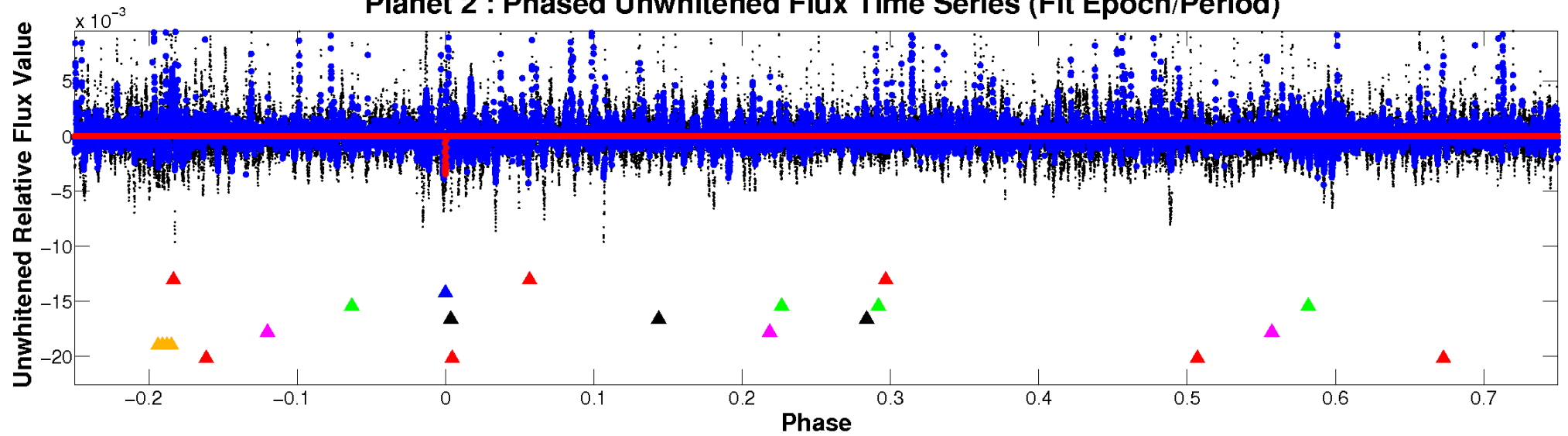
TCE 009450669-02



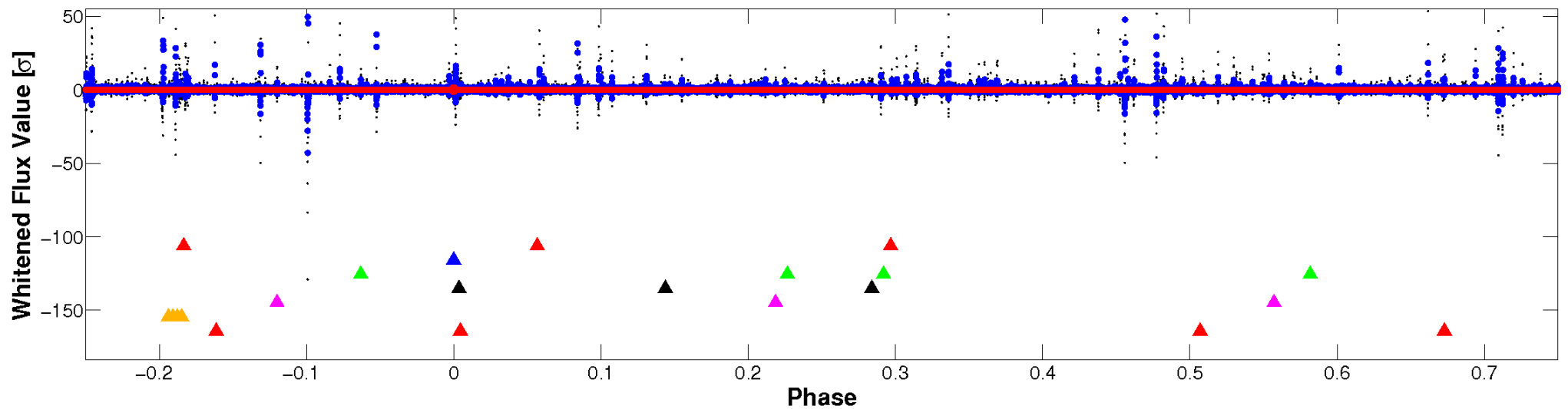


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



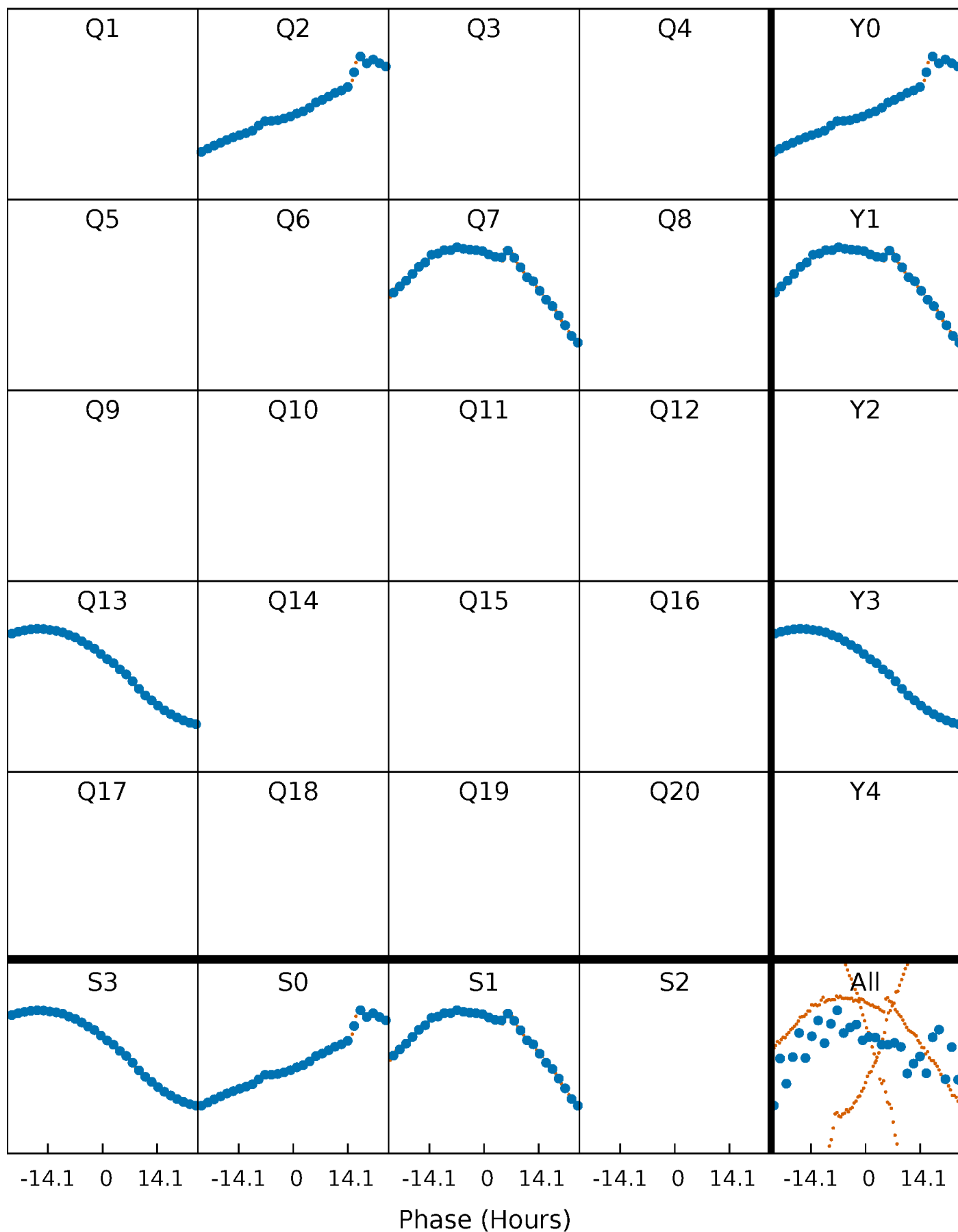
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





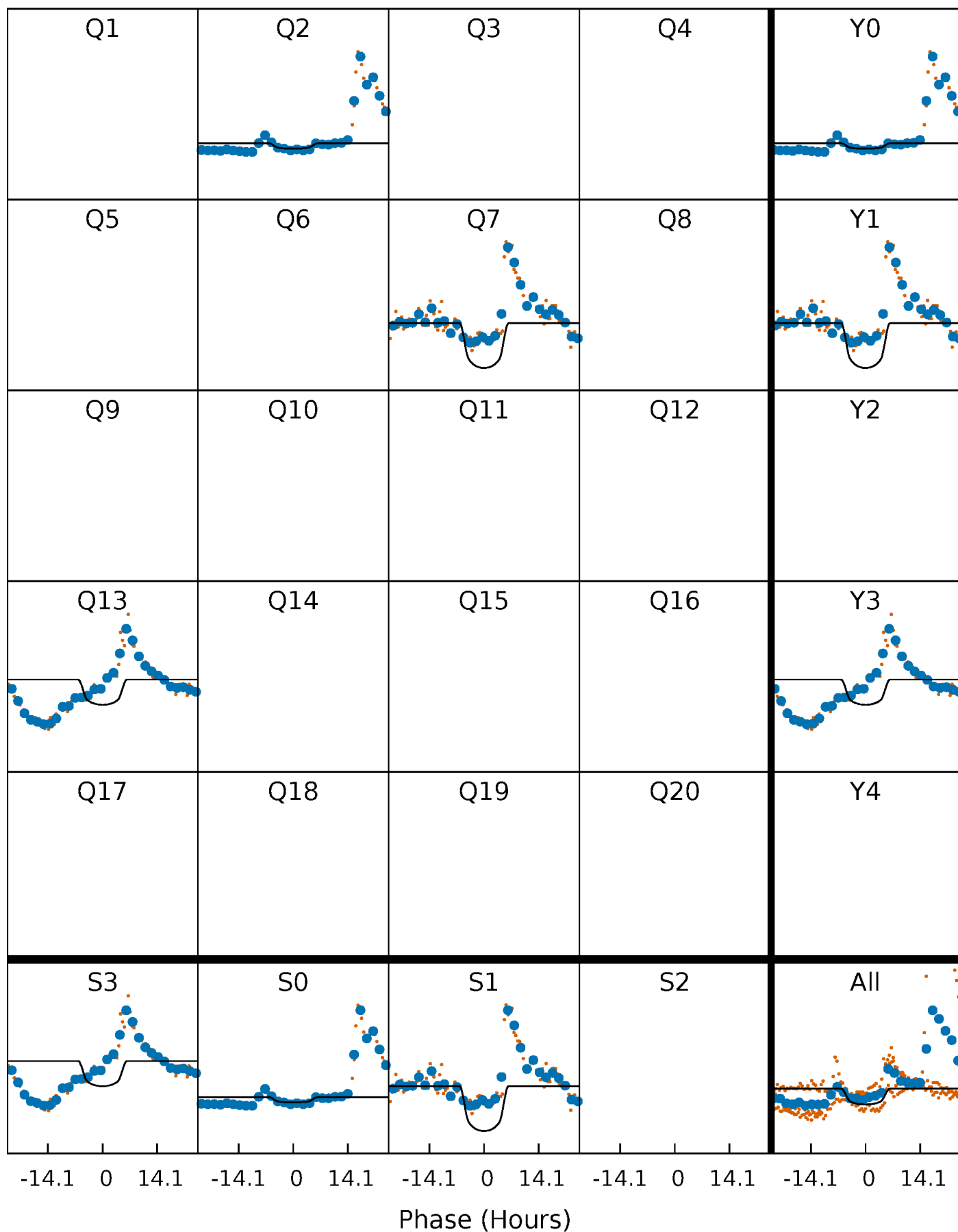
# PDC Quarter-Phased Transit Curves

TCE 009450669-02 P=478.087940 Days  $T_0=234.703569$  (BKJD)



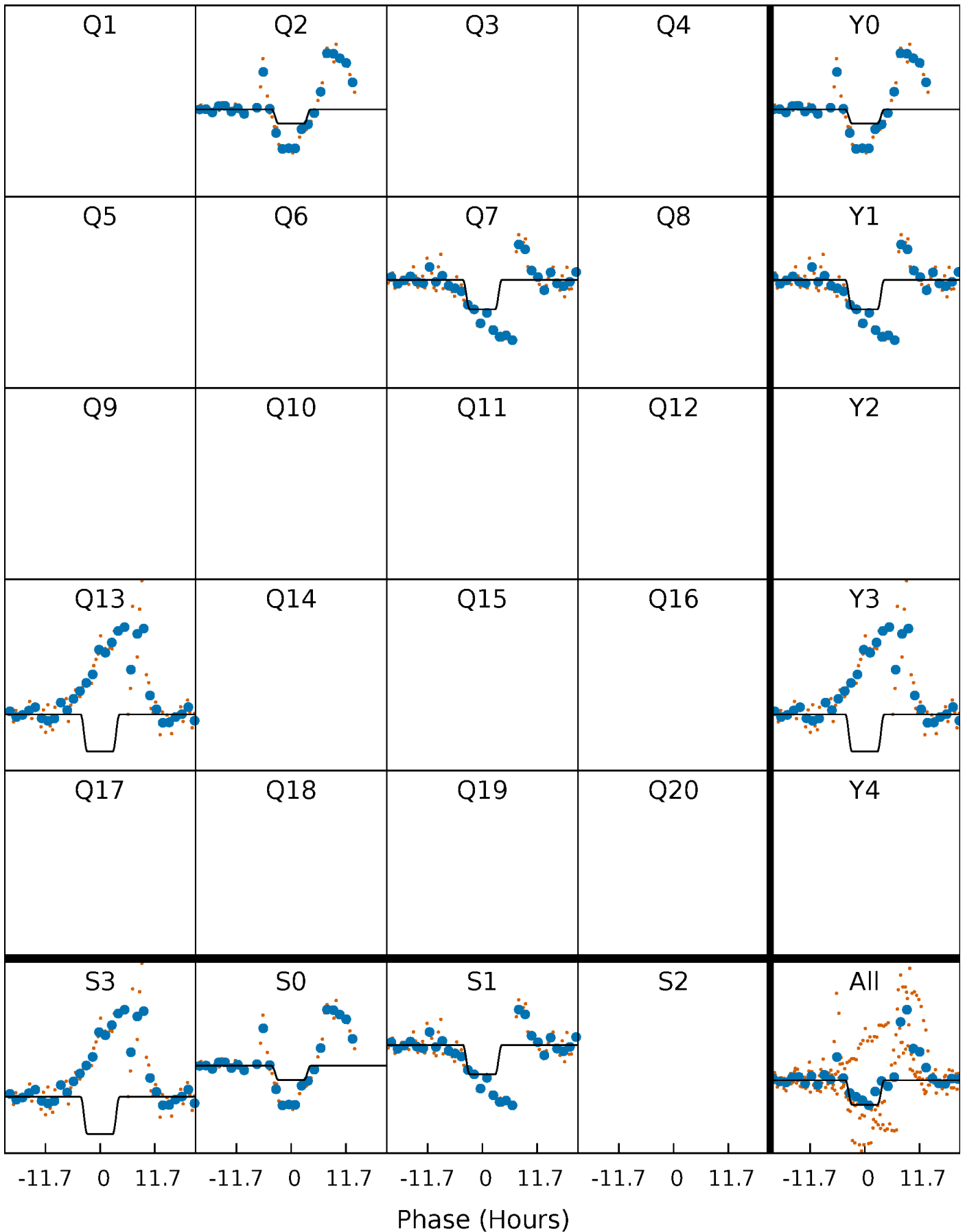
# DV Quarter-Phased Transit Curves

TCE 009450669-02     $P=478.087940$  Days     $T_0=234.703569$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

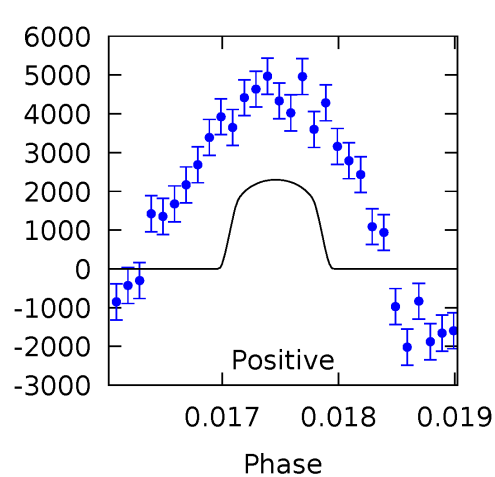
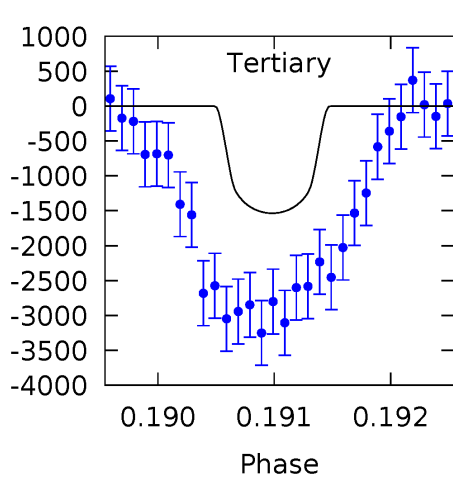
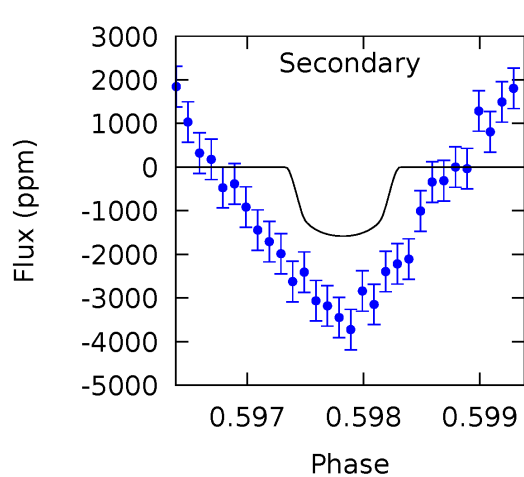
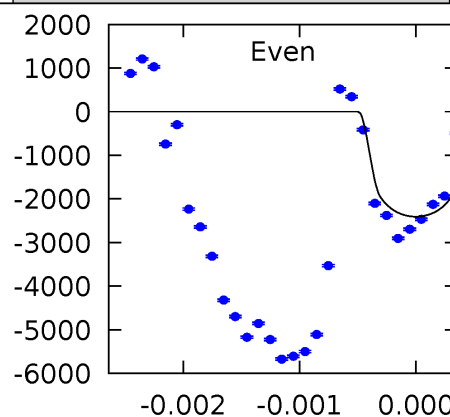
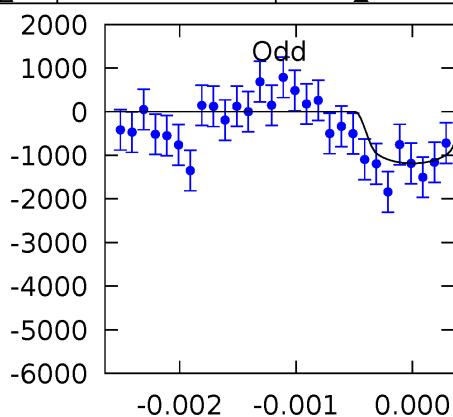
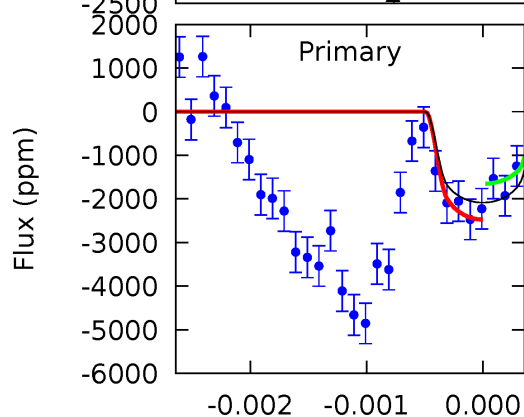
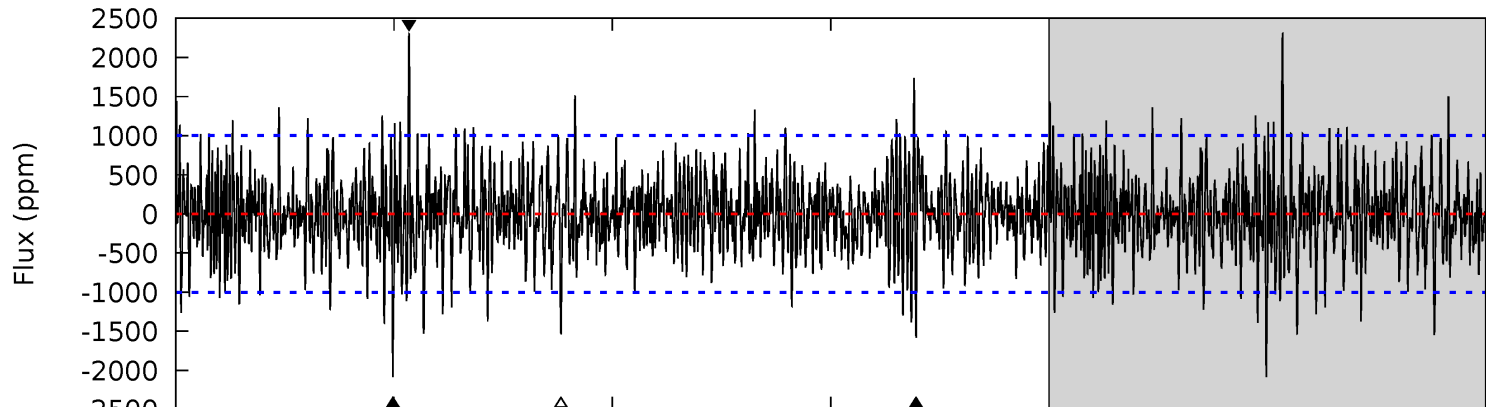
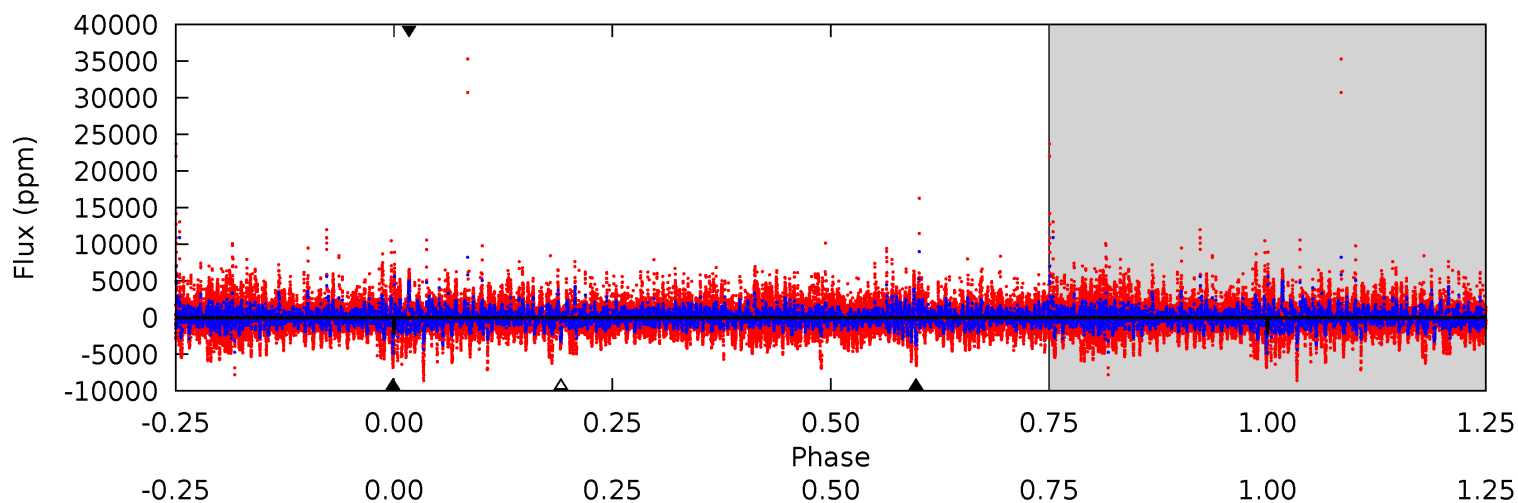
TCE 009450669-02     $P=478.077192$  Days     $T_0=234.629057$  (BKJD)



# DV Model-Shift Uniqueness Test

009450669-02, P = 478.087940 Days, E = 234.703569 Days

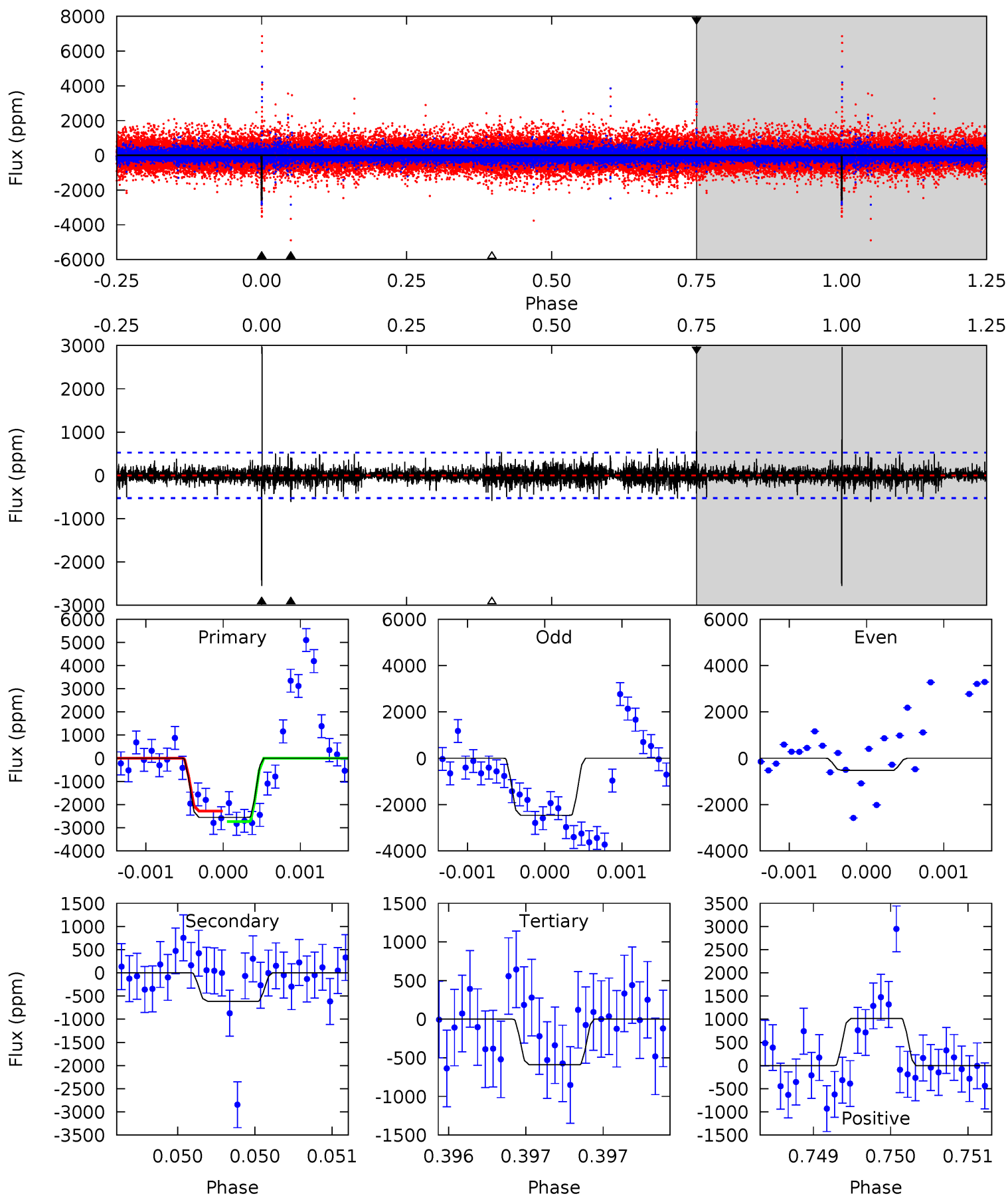
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	8.56	8.31	12.4	5.43	3.26	2.36	2.97	-1.16	0.25	-3.88	2.23	1.66	0.52	2.25



# Alt Model-Shift Uniqueness Test

009450669-02, P = 478.077192 Days, E = 234.629057 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.7	6.42	6.18	10.6	5.51	3.39	1.13	20.5	16.1	0.24	-4.22	12.1	0.52	0.54	2.29



### Stellar Parameters For KIC 009450669

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1583 \pm 185$	$3.92^{+0.48}_{-0.46}$	$230^{+9}_{-8}$	$4135^{+242}_{-214}$	$58001^{+17588}_{-14199}$
Alt.	$-613 \pm 95$	$2.72^{+0.48}_{-0.44}$	$230^{+8}_{-8}$	$3980^{+288}_{-263}$	$46568^{+21224}_{-14300}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

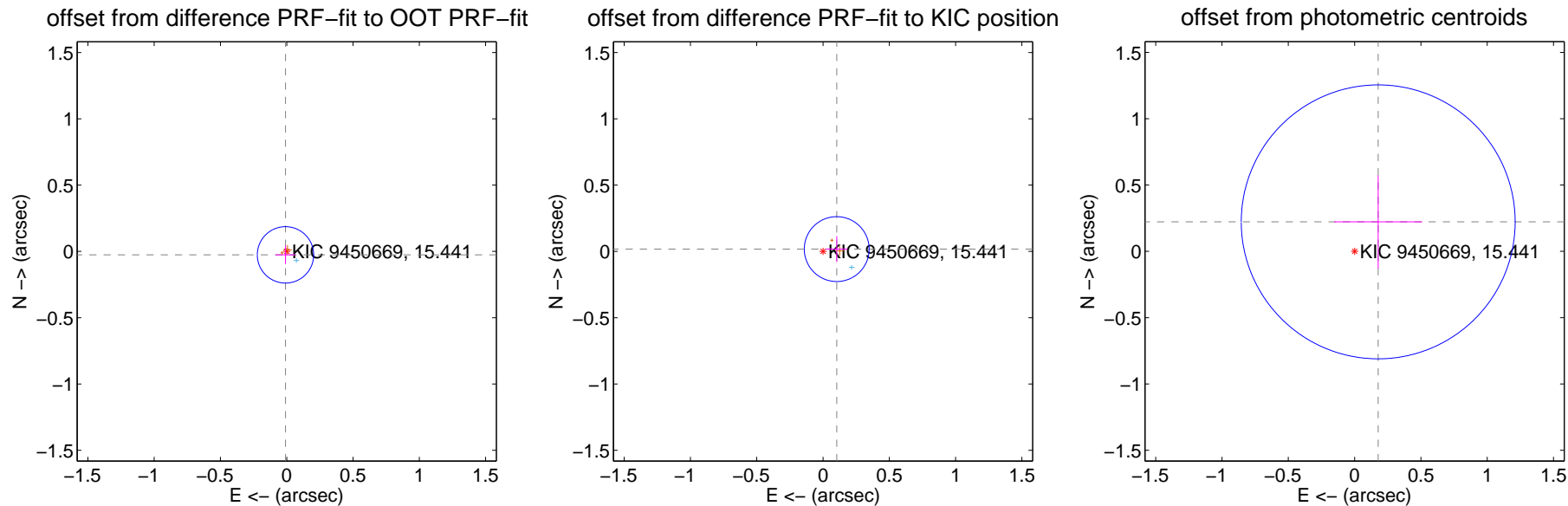
## DV Centroid Data

Supplemental centroid analysis for 009450669-02. Kepler magnitude: 15.44. Transit SNR 9.51

There are 1 quarters with good PRF difference image offsets

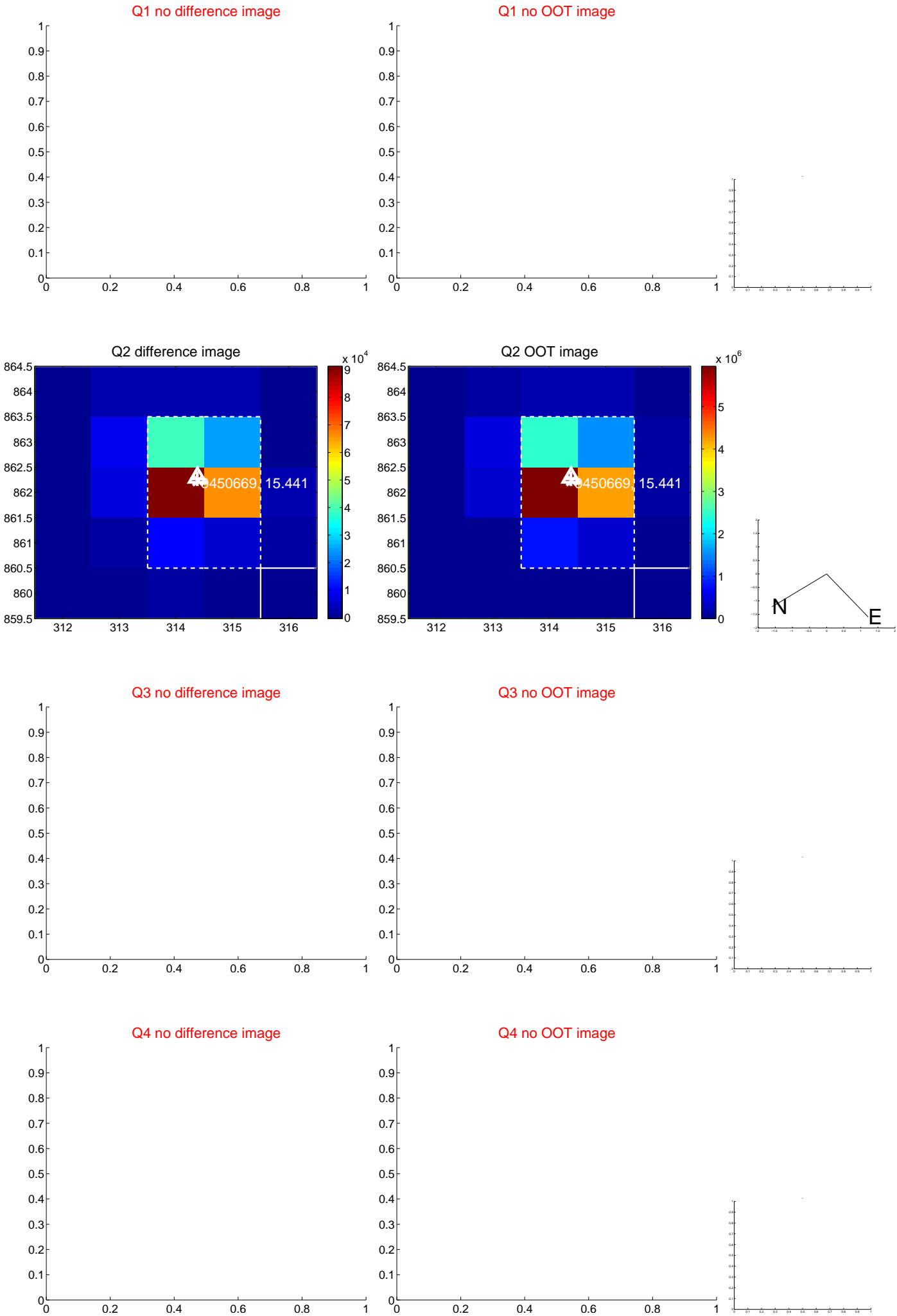
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.028 \pm 0.071$	0.39	$0.010 \pm 0.075$	$-0.026 \pm 0.070$
PRF-fit source offset from KIC position	$0.105 \pm 0.082$	1.28	$-0.103 \pm 0.081$	$0.018 \pm 0.097$
photometric centroid source offset	$0.28 \pm 0.34$	0.83	$-0.18 \pm 0.33$	$0.22 \pm 0.35$



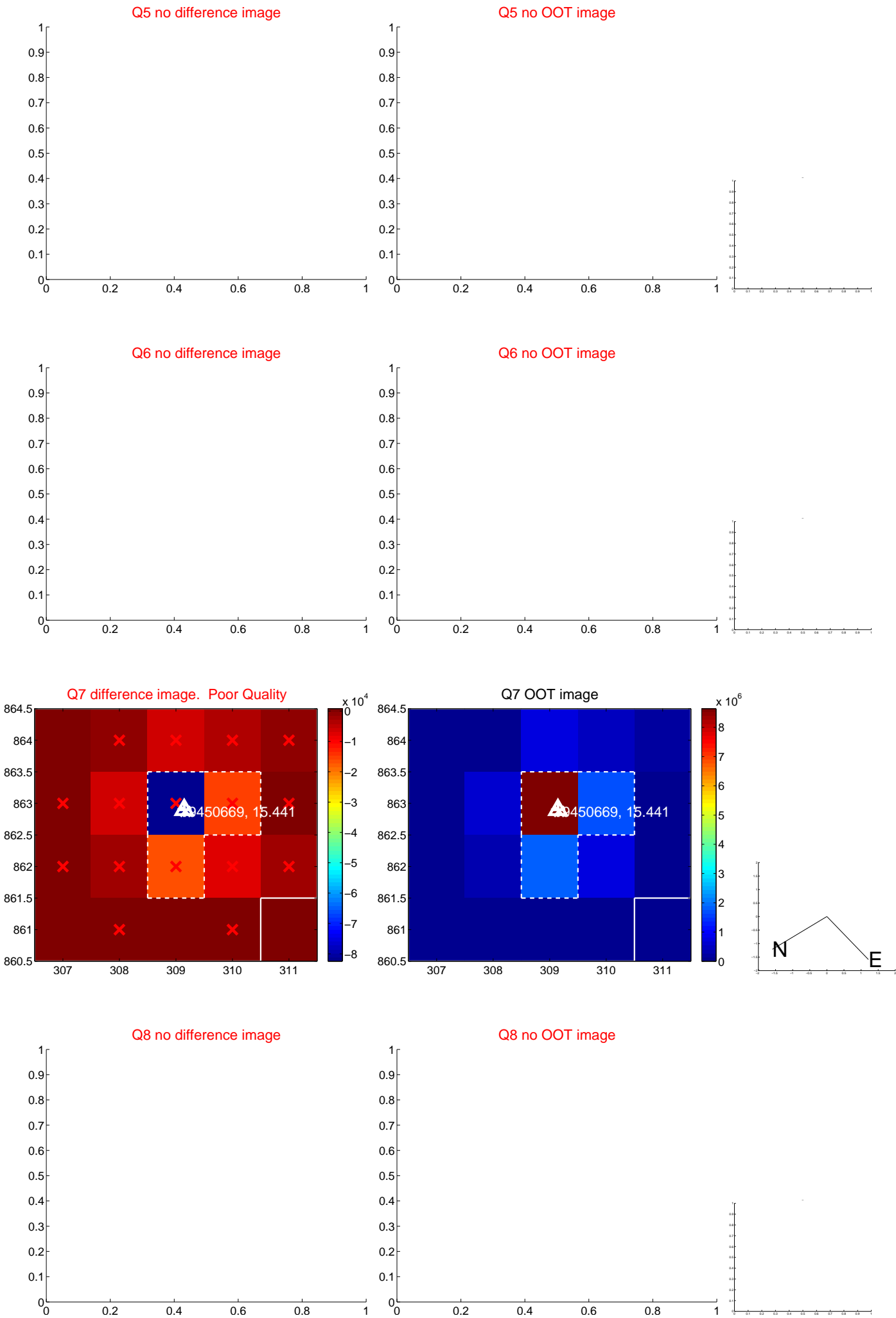
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.





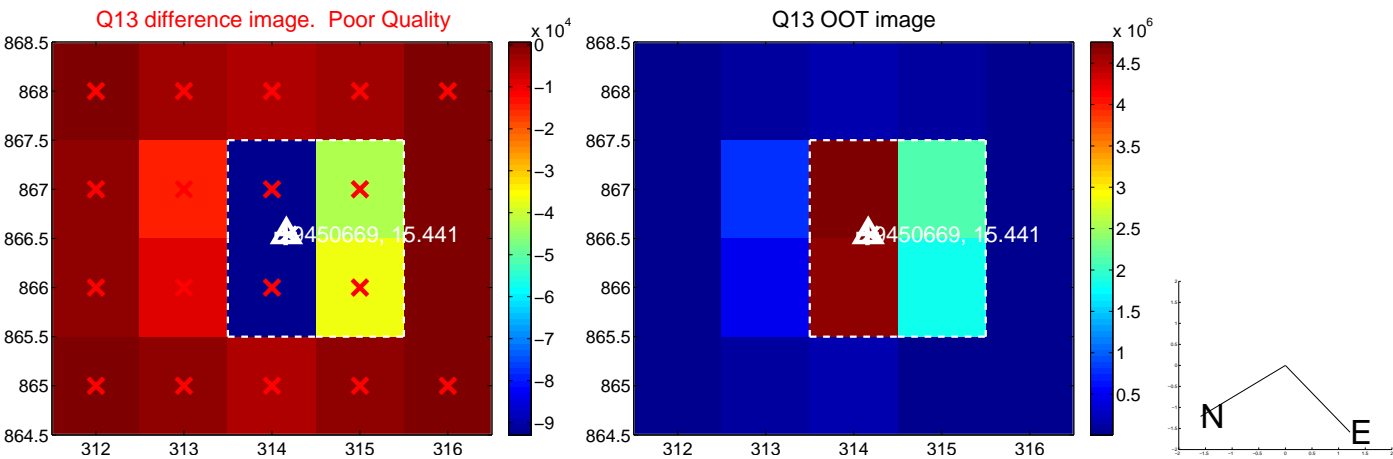
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



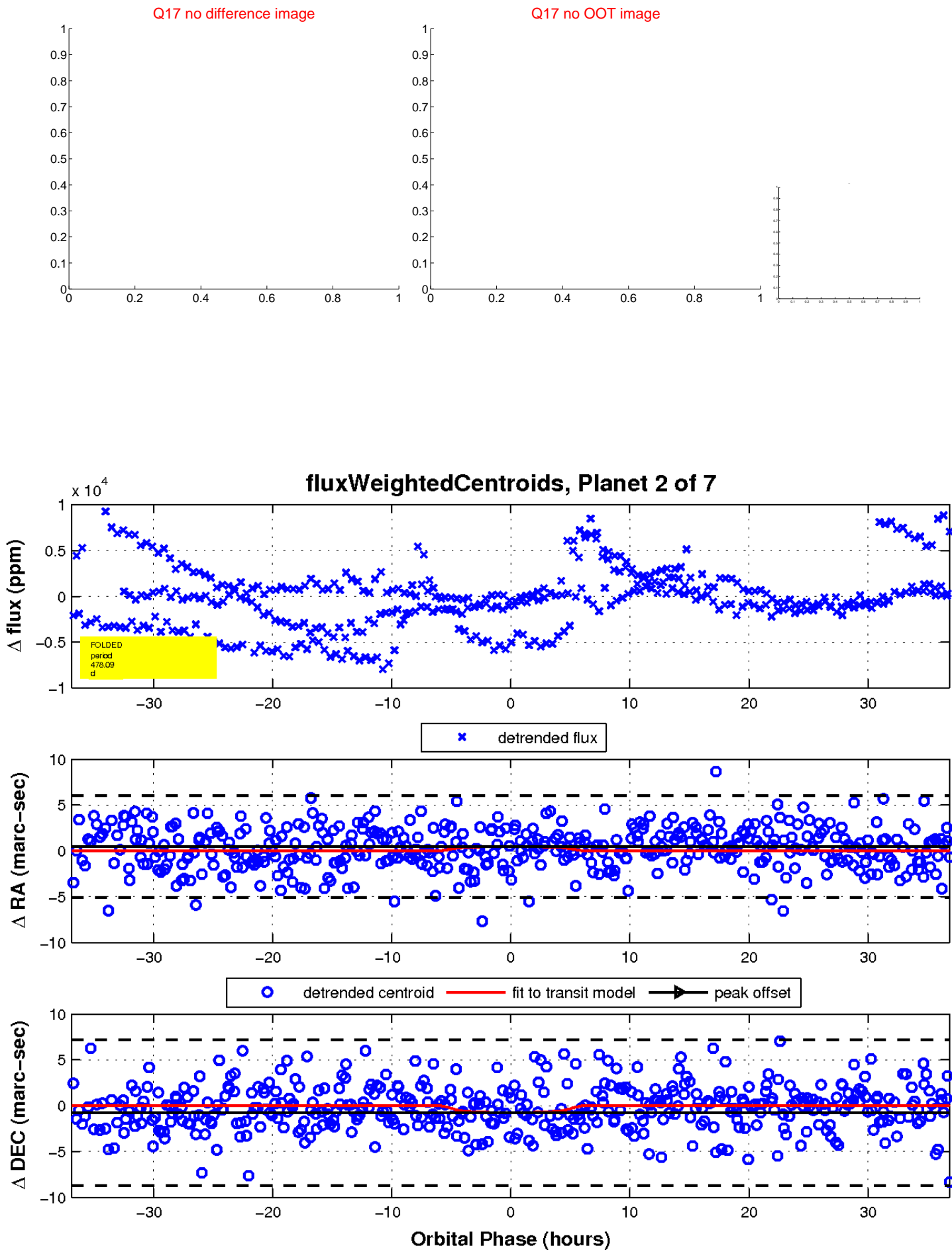
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

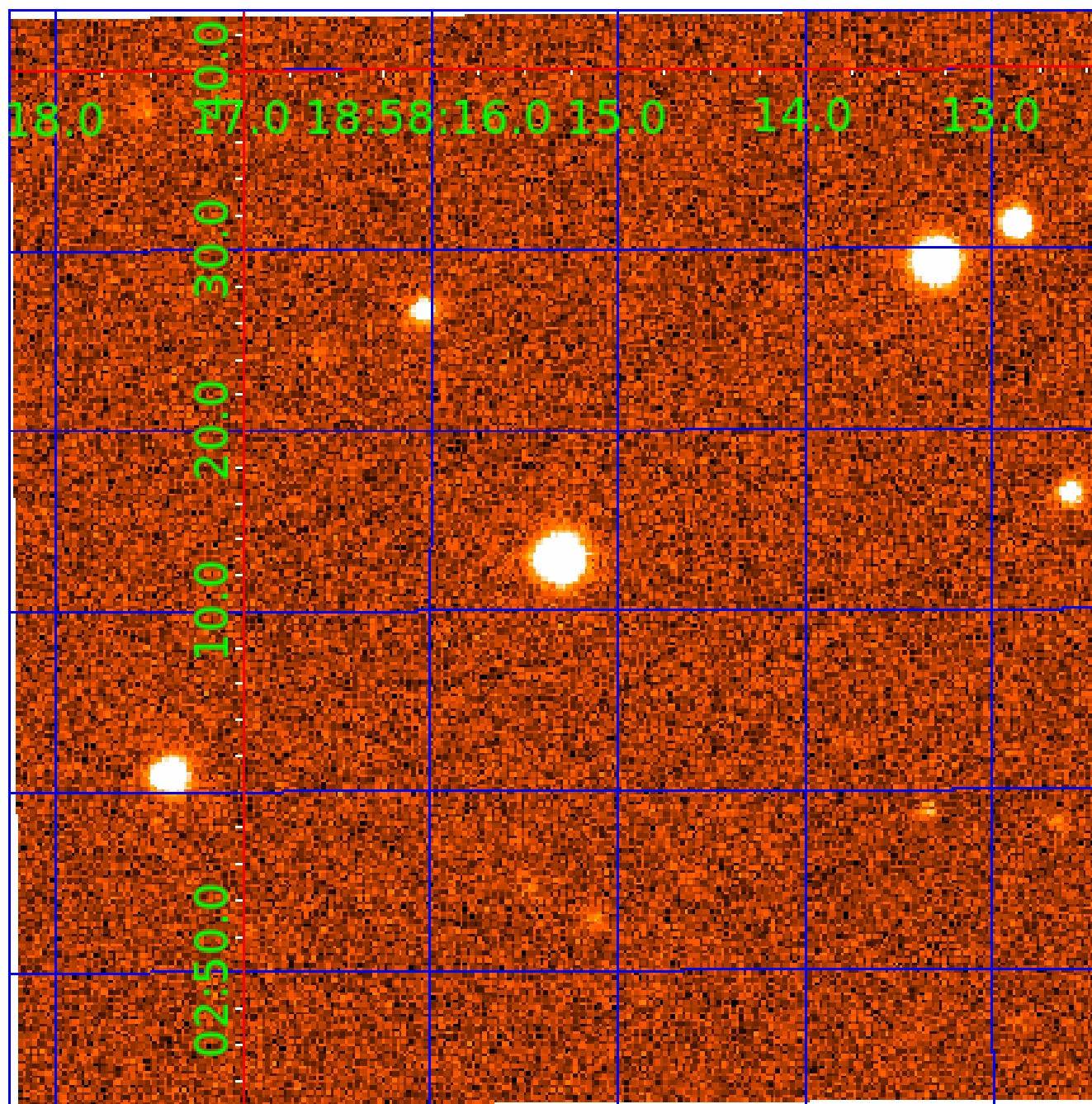


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
009450669-02	OBS	No	478.087940	234.703569	3454.2	12.306	17.3	9.5	0.59	4866	3.94	0.17
009450669-03	OBS	No	308.327828	374.263208	2327.8	5.229	18.0	9.1	0.59	4866	4.63	0.32
009450669-04	OBS	No	545.110344	236.416352	3176.8	4.963	17.3	11.3	0.59	4866	3.68	0.15
009450669-05	OBS	No	639.970752	177.323963	2264.6	4.765	16.7	7.6	0.59	4866	2.90	0.12
009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009450669-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT— CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

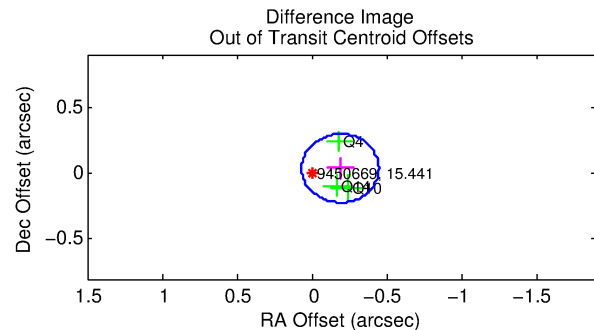
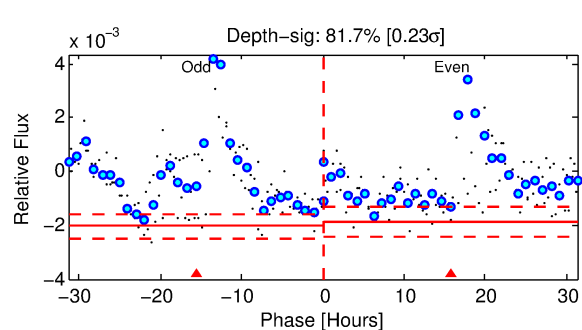
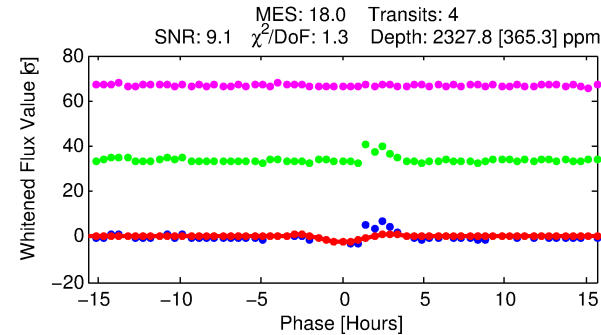
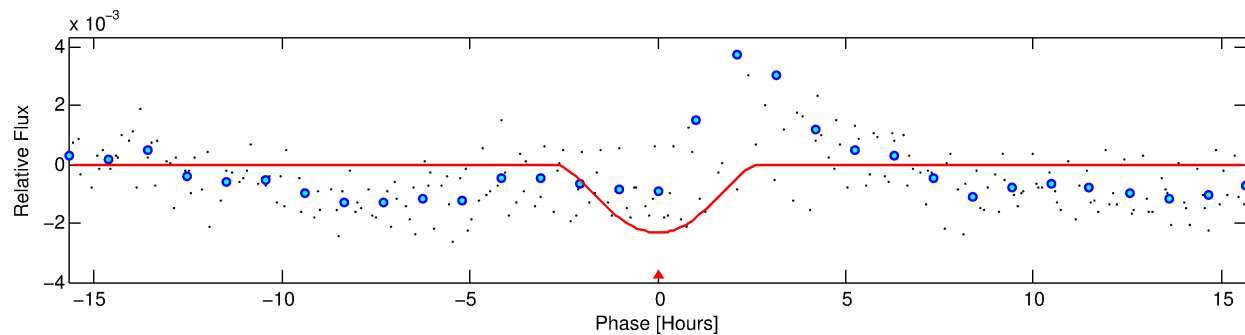
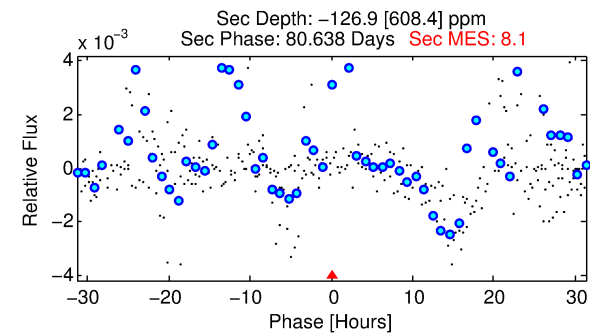
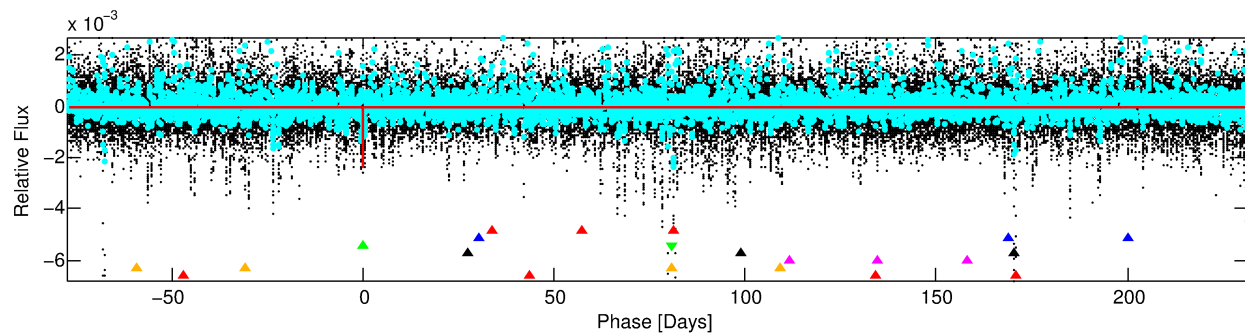
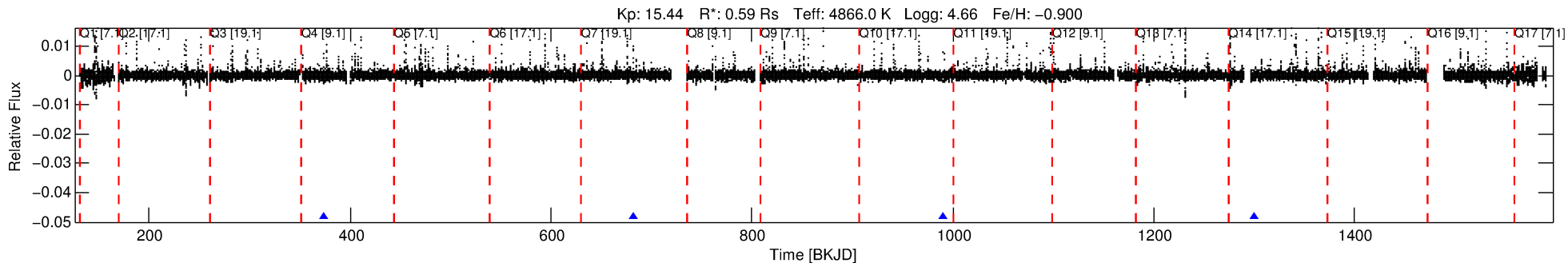
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009450669-03

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 3 of 7 Period: 308.328 d



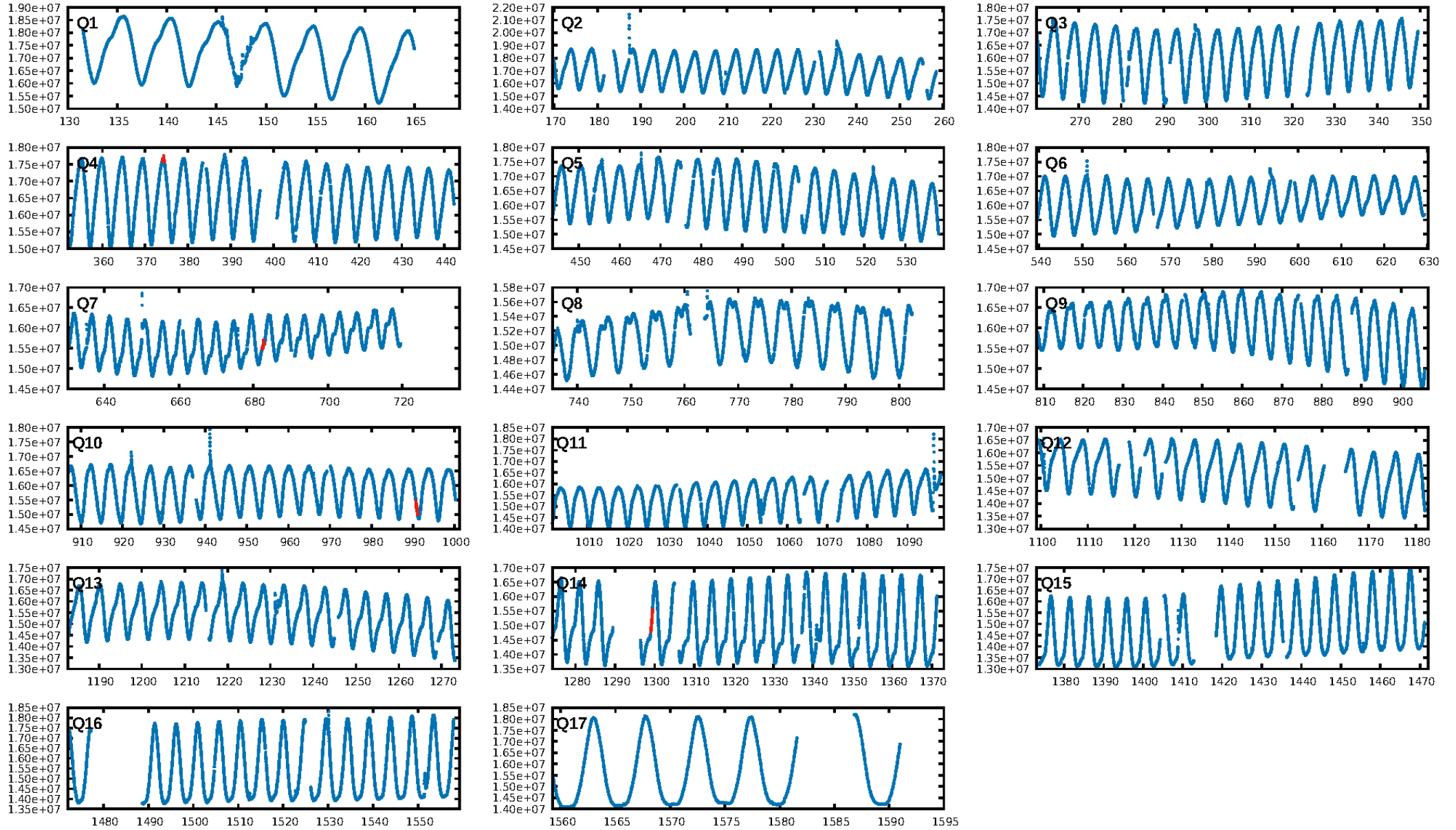
## DV Fit Results:

Period = 308.32783 [0.00571] d  
Epoch = 374.2632 [0.0096] BKJD  
Rp/R\* = 0.0716 [0.1190]  
a/R\* = 198.56 [99.03]  
b = 0.98 [0.20]  
Seff = 0.31 [0.05]  
Teff = 191 [8] K  
Rp = 4.63 [7.71] Re  
a = 0.7489 [0.0509] AU  
Ag = N/A  
Teffp = N/A

## DV Diagnostic Results:

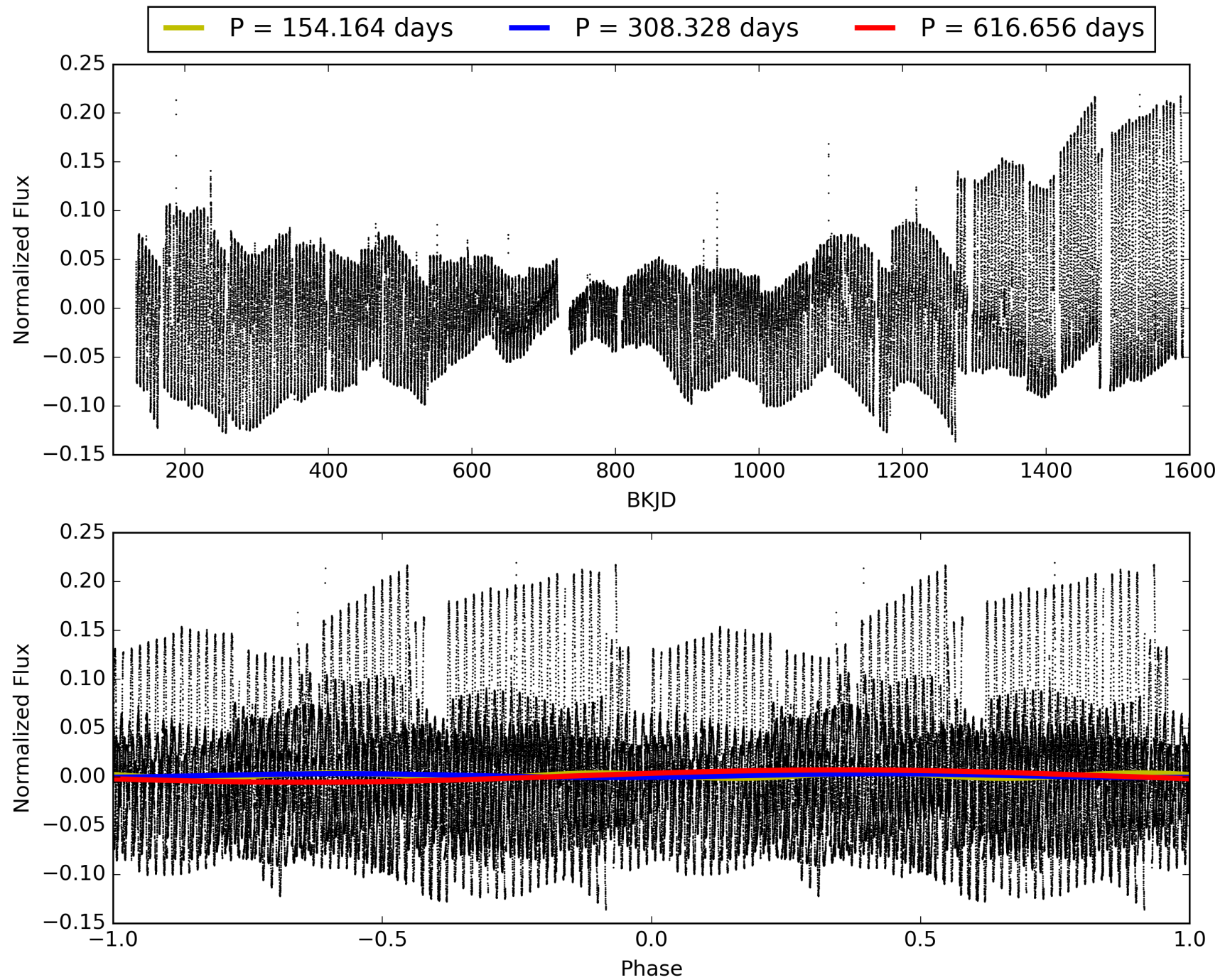
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [237.50σ]  
ModelChiSquare2-sig: 0.3%  
ModelChiSquareGof-sig: 70.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.635  
Centroid-sig: 15.3%  
Centroid-so: 0.818 arcsec [1.13σ]  
OotOffset-rm: 0.195 arcsec [2.25σ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-rm: 0.326 arcsec [3.77σ]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 009450669-03, PDC Light Curves



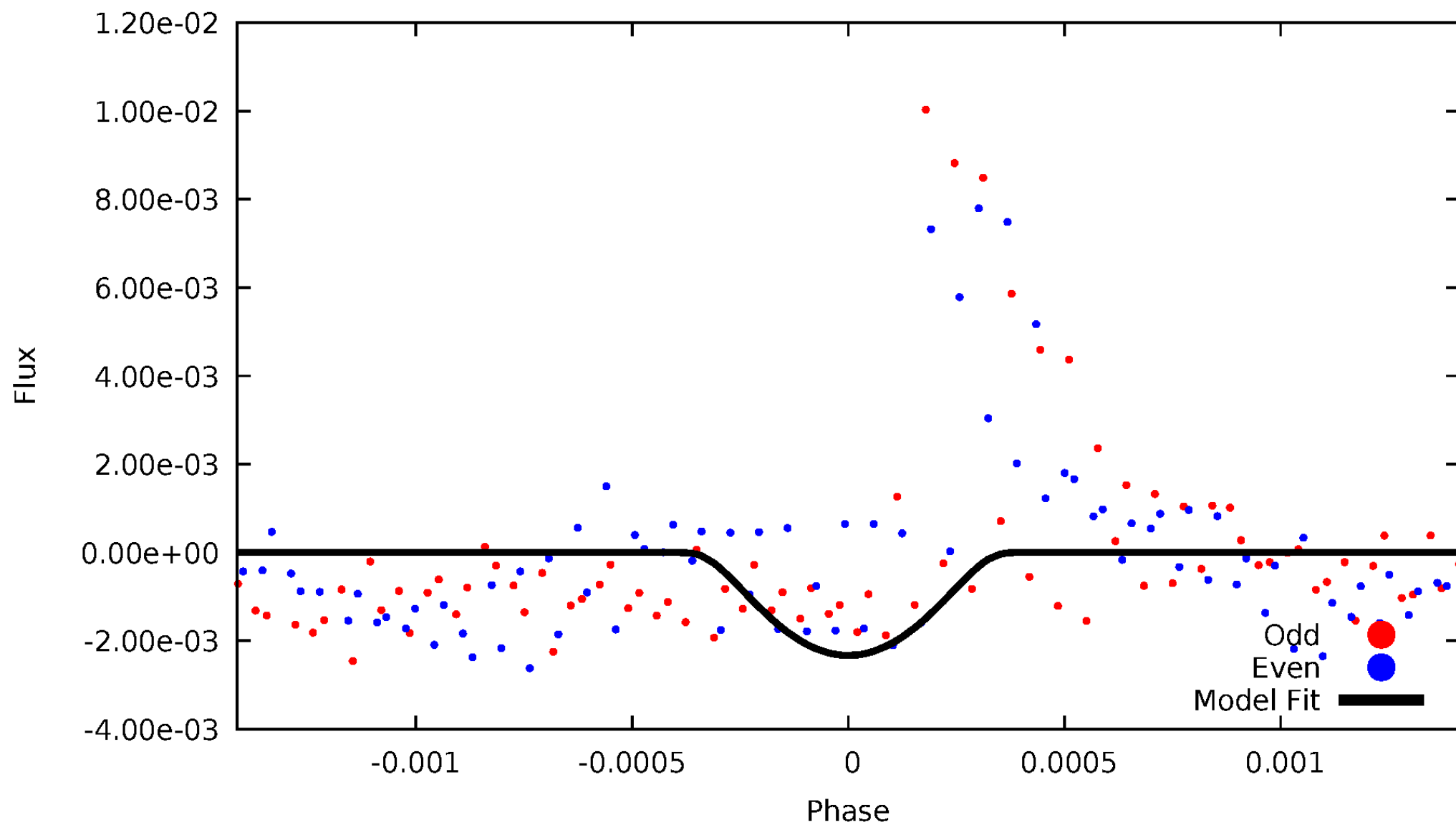


TCE 009450669-03



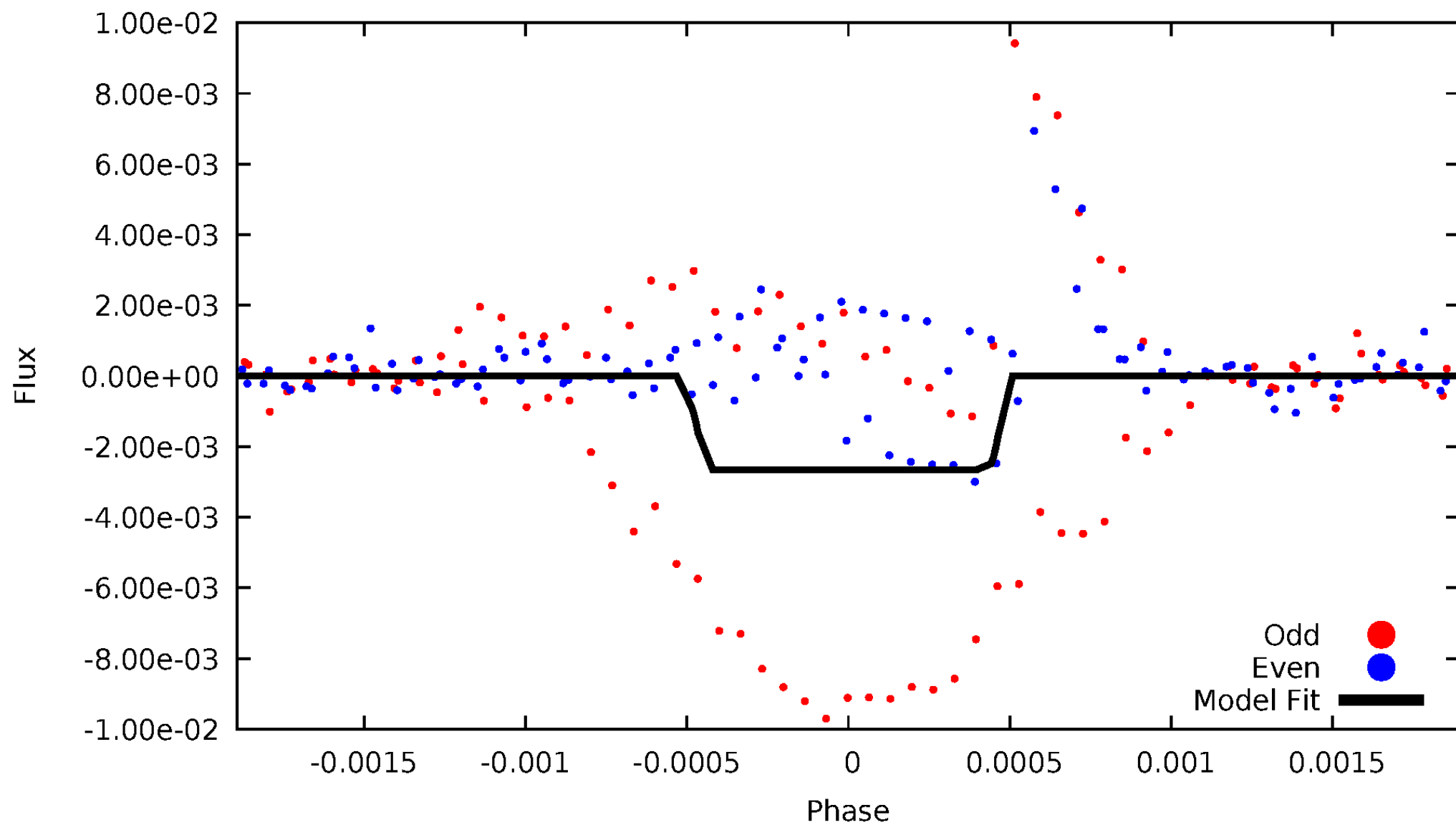
# DV Odd/Even

TCE 009450669-03



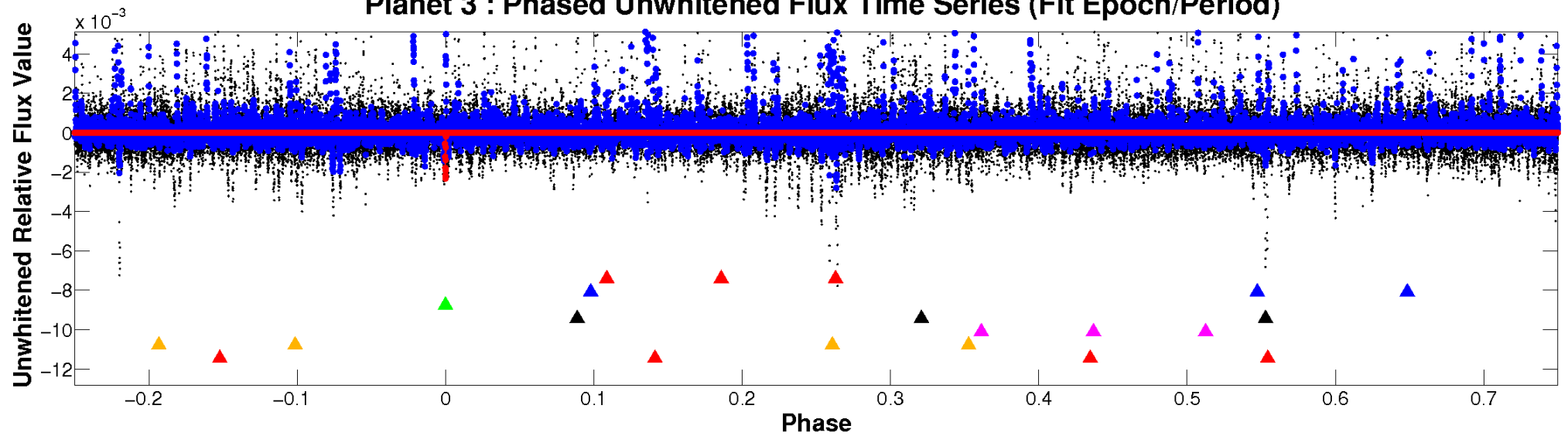
# ALT Odd/Even

TCE 009450669-03

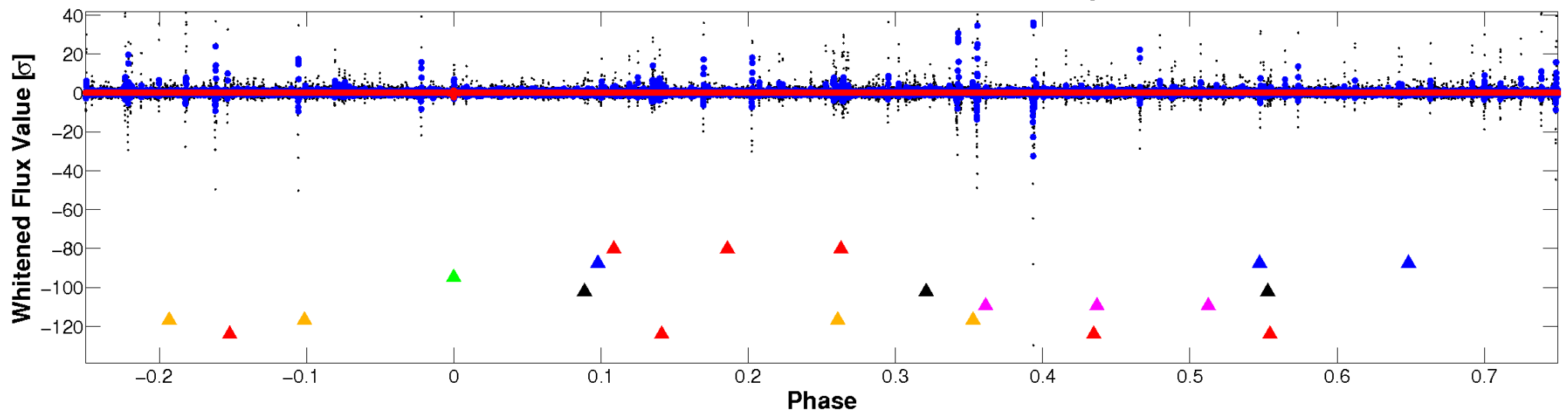


# Non-Whitened Vs. Whitened Light Curve

**Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

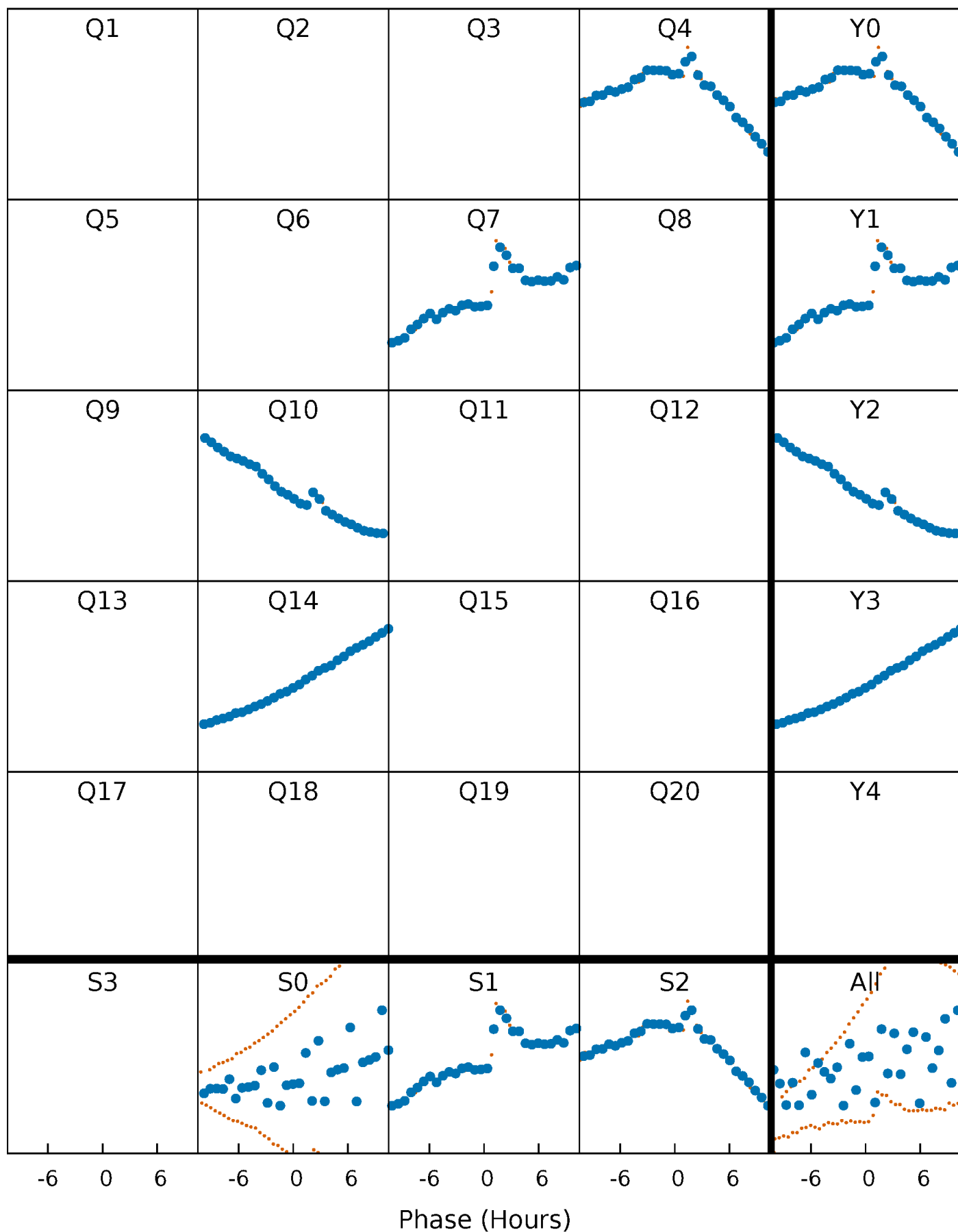


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



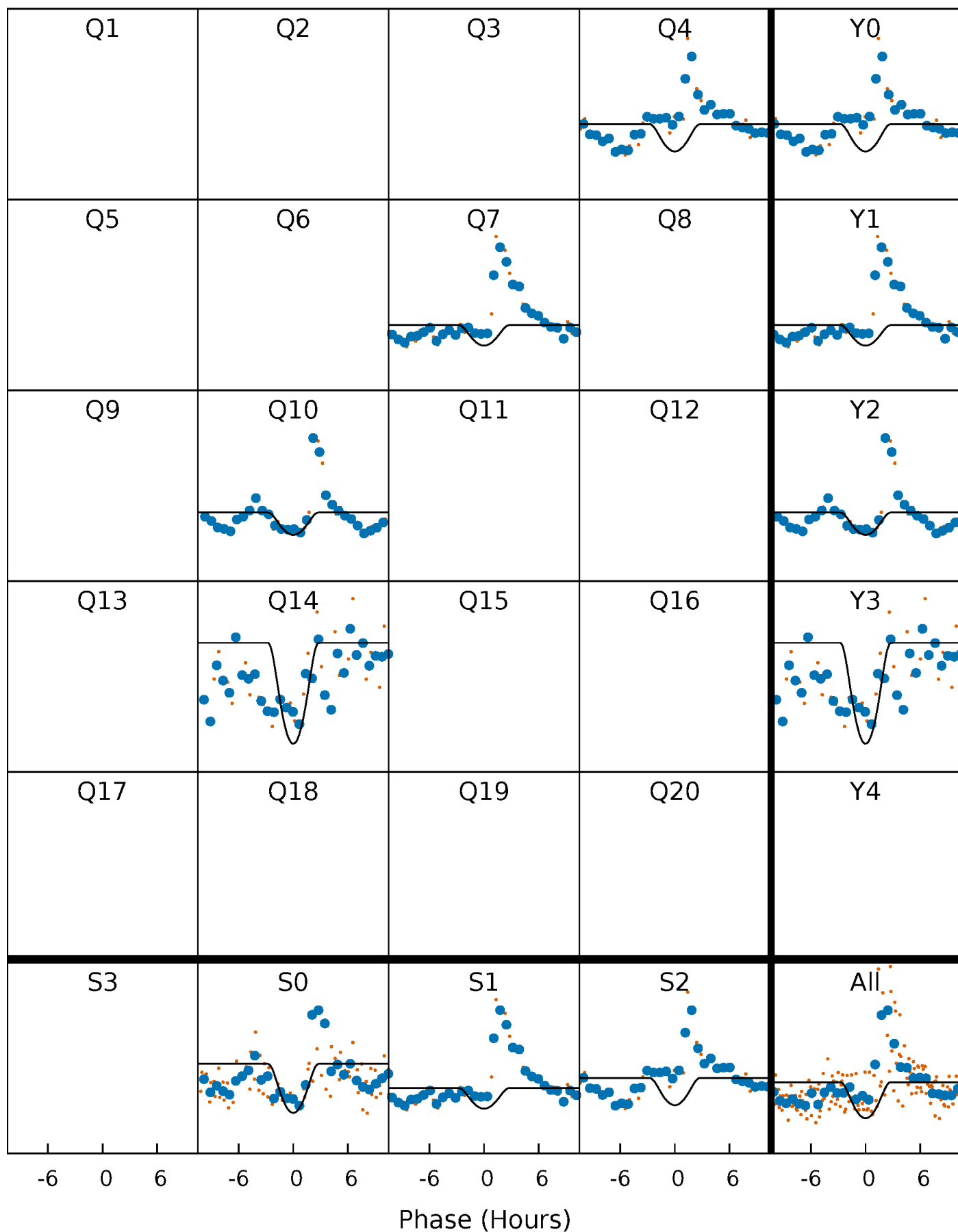
# PDC Quarter-Phased Transit Curves

TCE 009450669-03 P=308.327828 Days  $T_0=374.263208$  (BKJD)



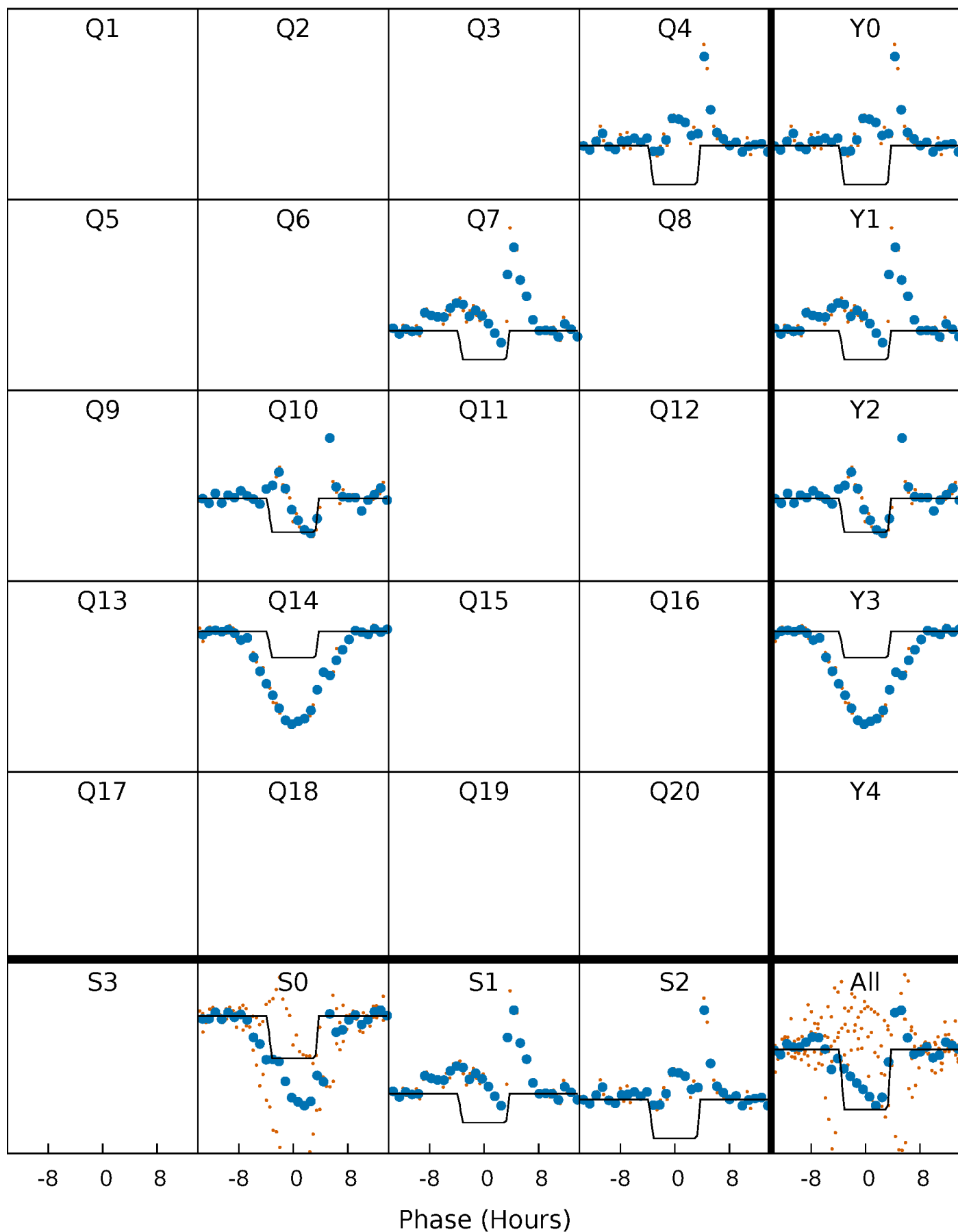
# DV Quarter-Phased Transit Curves

TCE 009450669-03     $P=308.327828$  Days     $T_0=374.263208$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

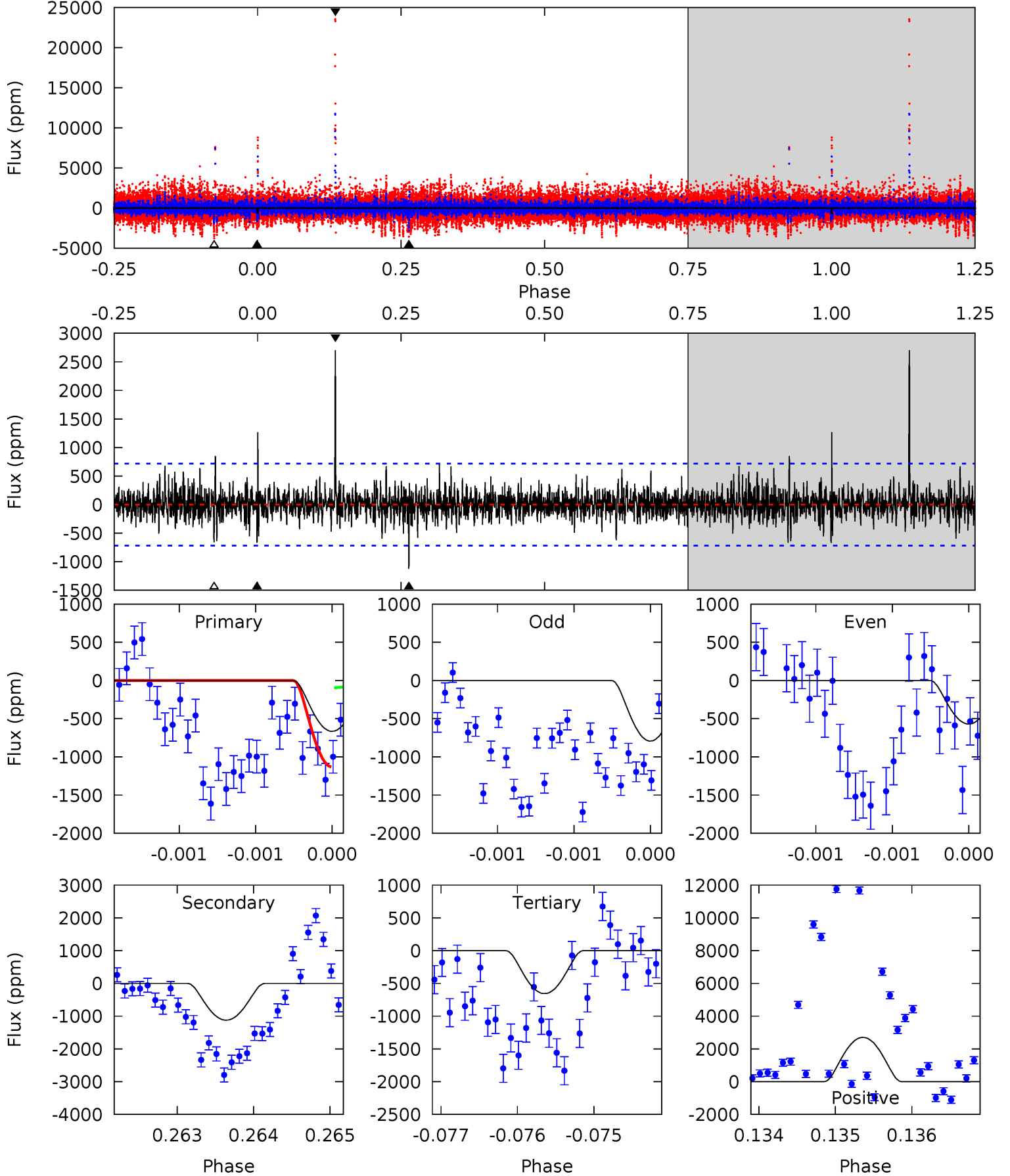
TCE 009450669-03     $P=308.342420$  Days     $T_0=374.144834$  (BKJD)



# DV Model-Shift Uniqueness Test

009450669-03,  $P = 308.327828$  Days,  $E = 65.935380$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.10	8.60	5.02	20.7	5.50	3.37	1.35	0.08	-15.6	3.57	-12.1	0.60	0.84	0.71	3.96

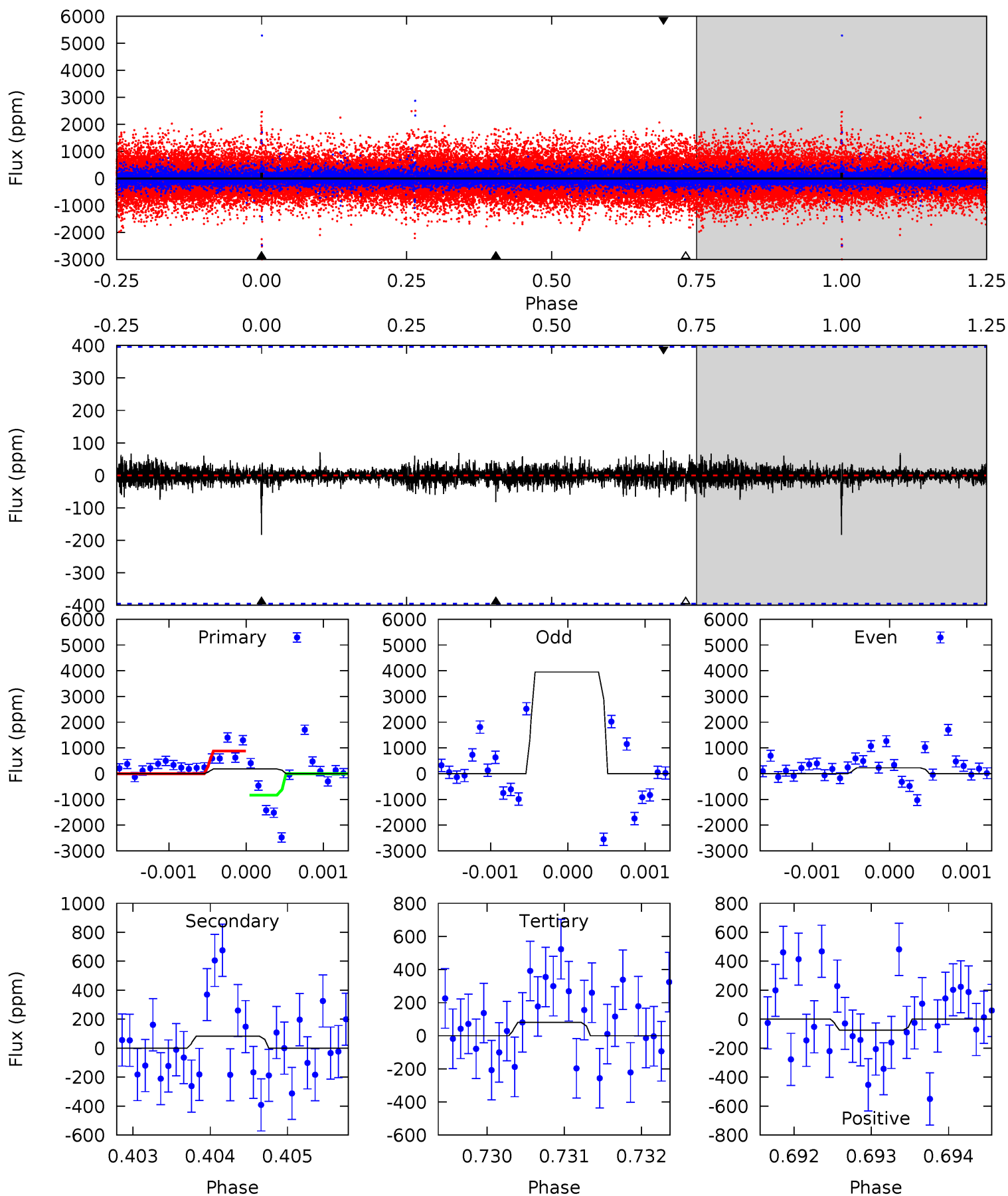




# Alt Model-Shift Uniqueness Test

009450669-03, P = 308.342420 Days, E = 65.802414 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.52	1.13	1.11	1.06	5.45	3.29	0.22	1.41	1.46	0.02	0.07	31.1	-50.9	0.30	0



### Stellar Parameters For KIC 009450669

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1123 \pm 131$	$7.42^{+6.22}_{-4.86}$	$266^{+10}_{-10}$	$3168^{+1416}_{-505}$	$6392^{+48494}_{-4582}$
Alt.	$-82 \pm 73$	$6.72^{+5.71}_{-4.78}$	$266^{+10}_{-10}$	$2266^{+842}_{-520}$	$460^{+4551}_{-426}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

## DV Centroid Data

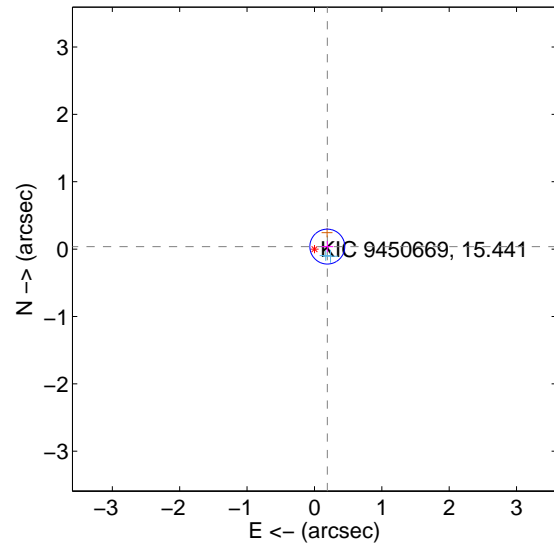
Supplemental centroid analysis for 009450669-03. Kepler magnitude: 15.44. Transit SNR 9.12

There are 2 quarters with good PRF difference image offsets

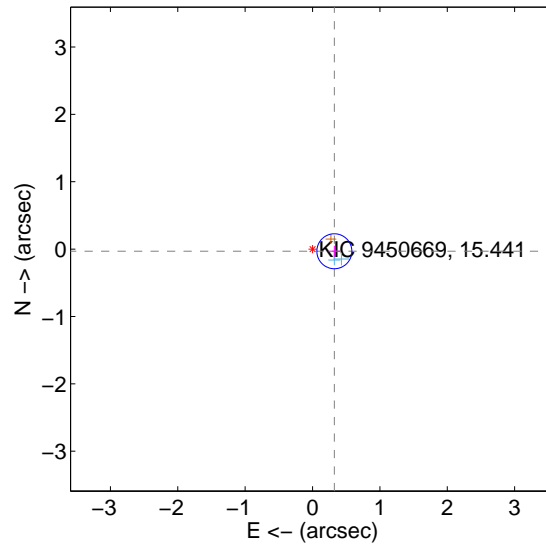
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.195 \pm 0.086$	2.25	$-0.191 \pm 0.087$	$0.037 \pm 0.082$
PRF-fit source offset from KIC position	$0.326 \pm 0.087$	3.77	$-0.324 \pm 0.087$	$-0.032 \pm 0.082$
photometric centroid source offset	$0.82 \pm 0.73$	1.13	$-0.42 \pm 0.67$	$0.70 \pm 0.74$

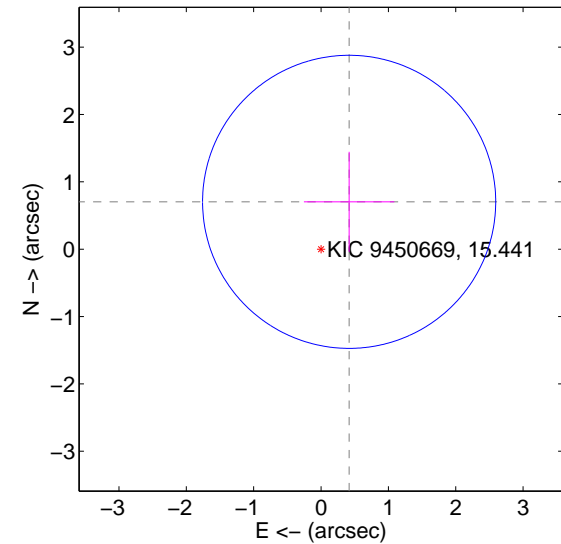
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

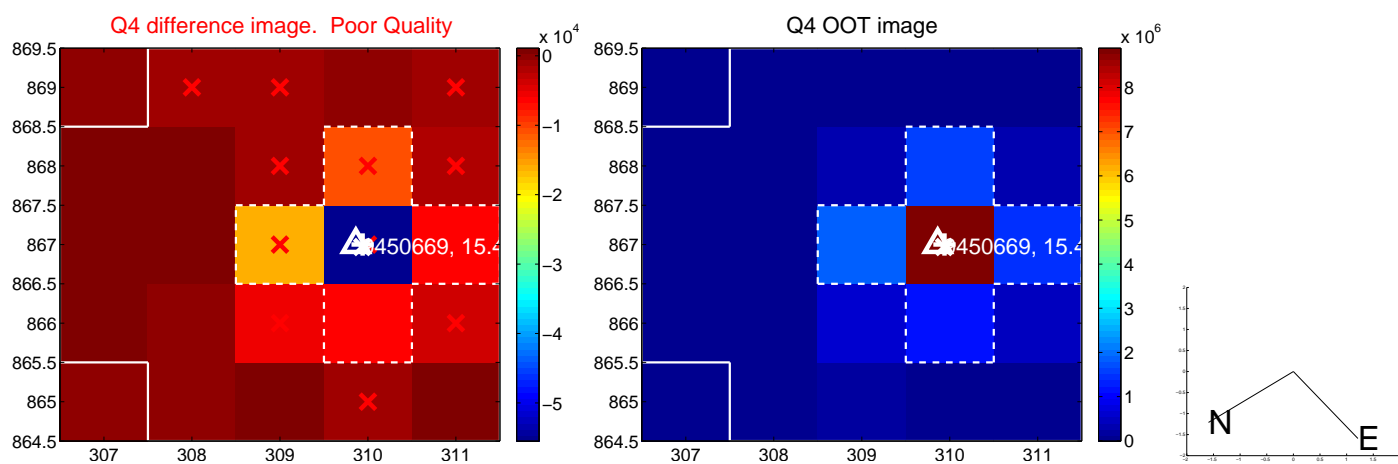
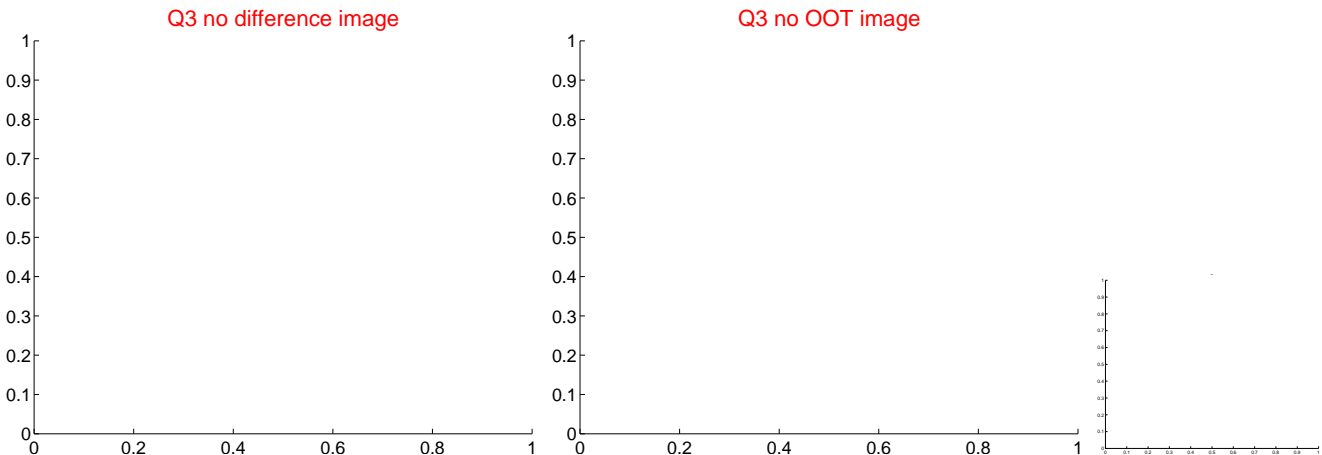
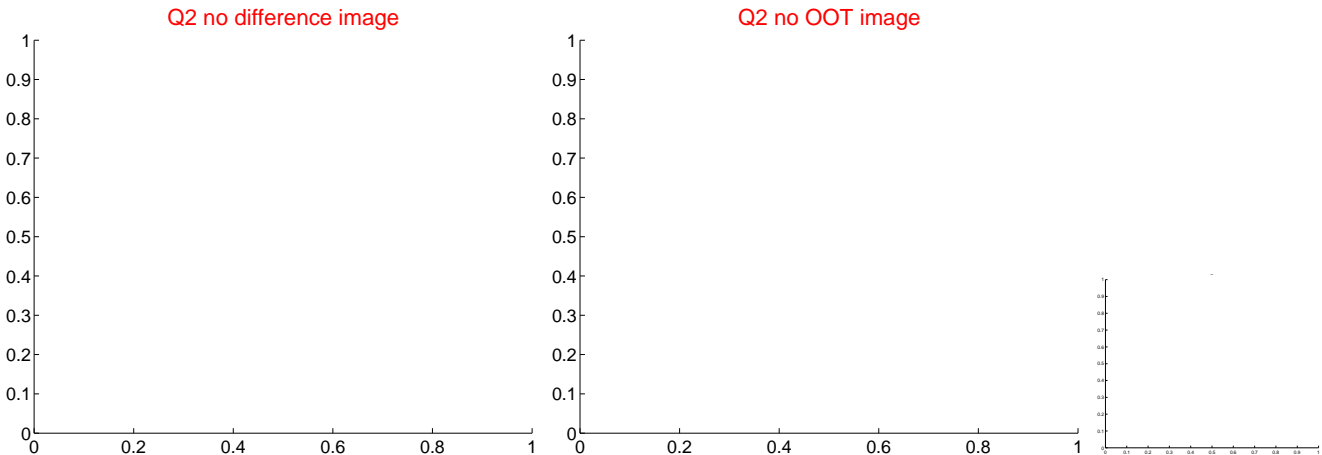
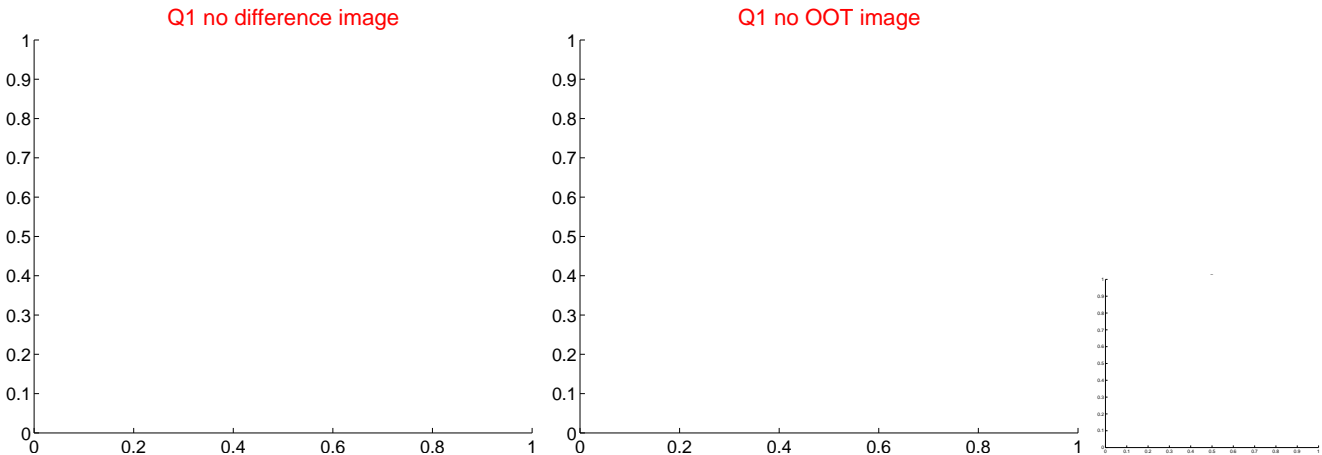


offset from photometric centroids

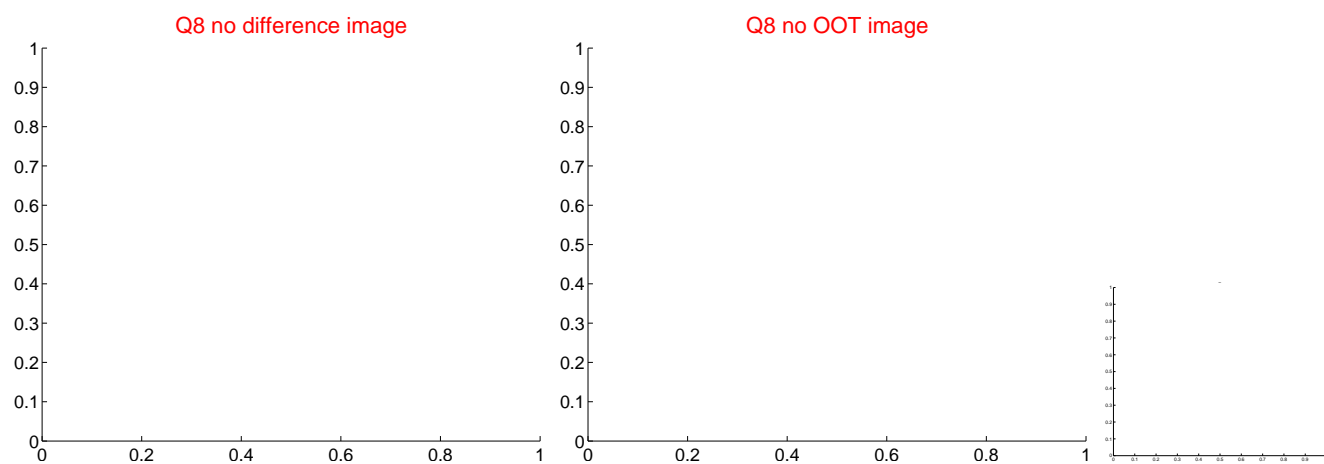
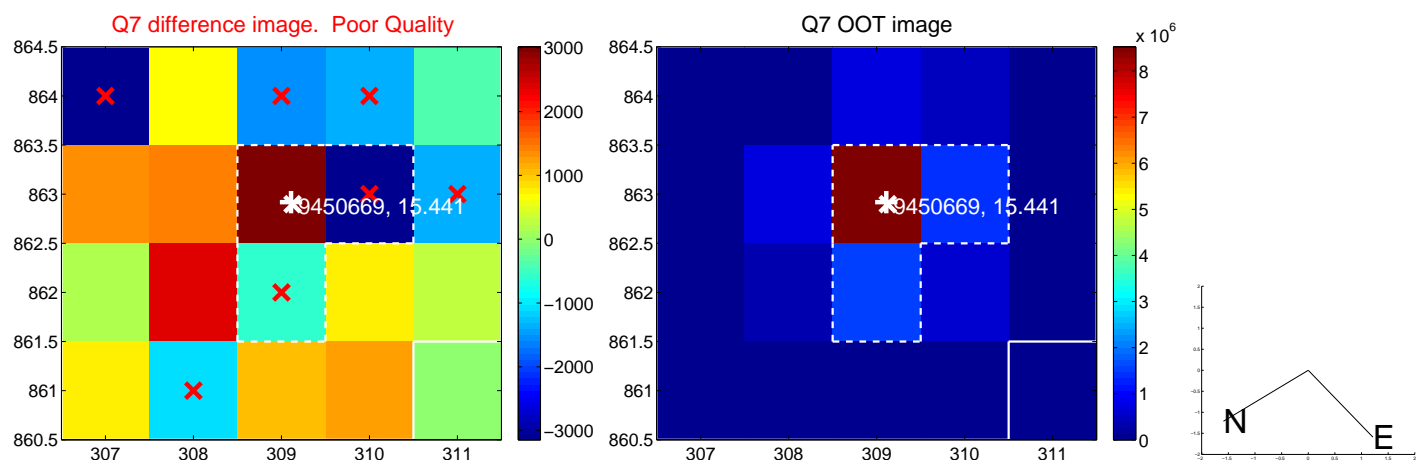
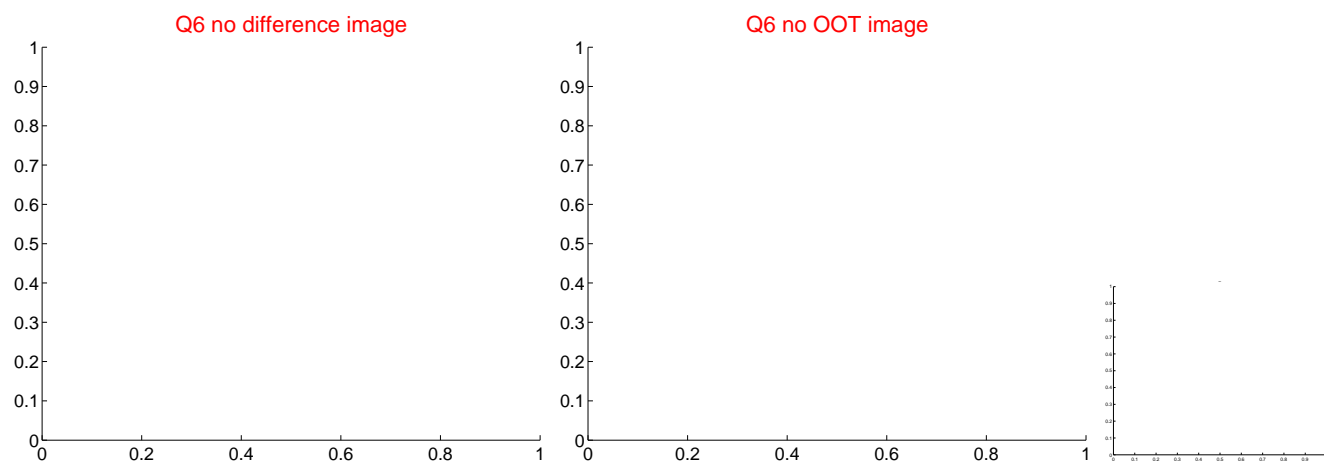
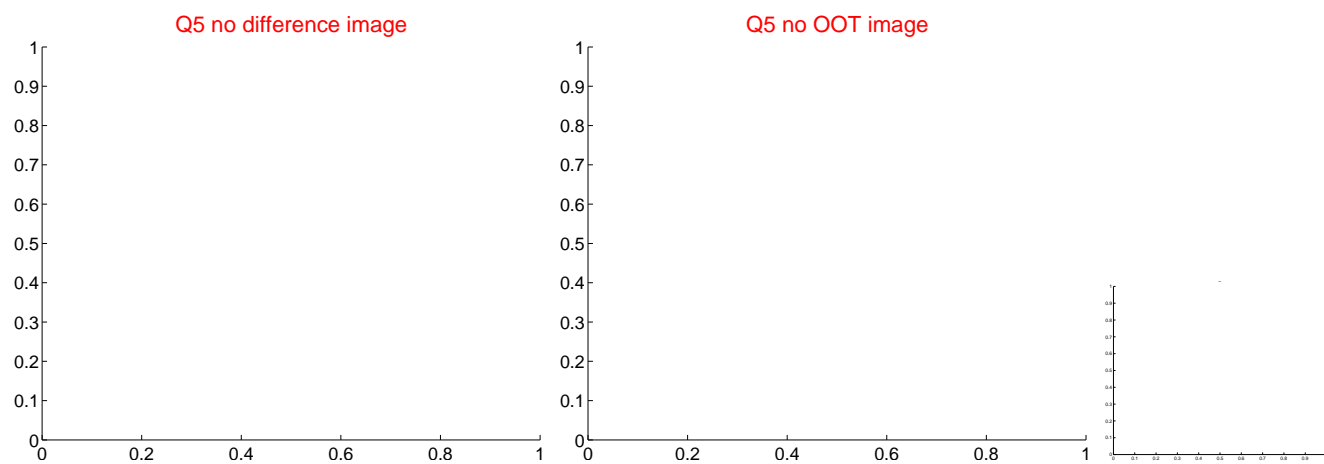


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

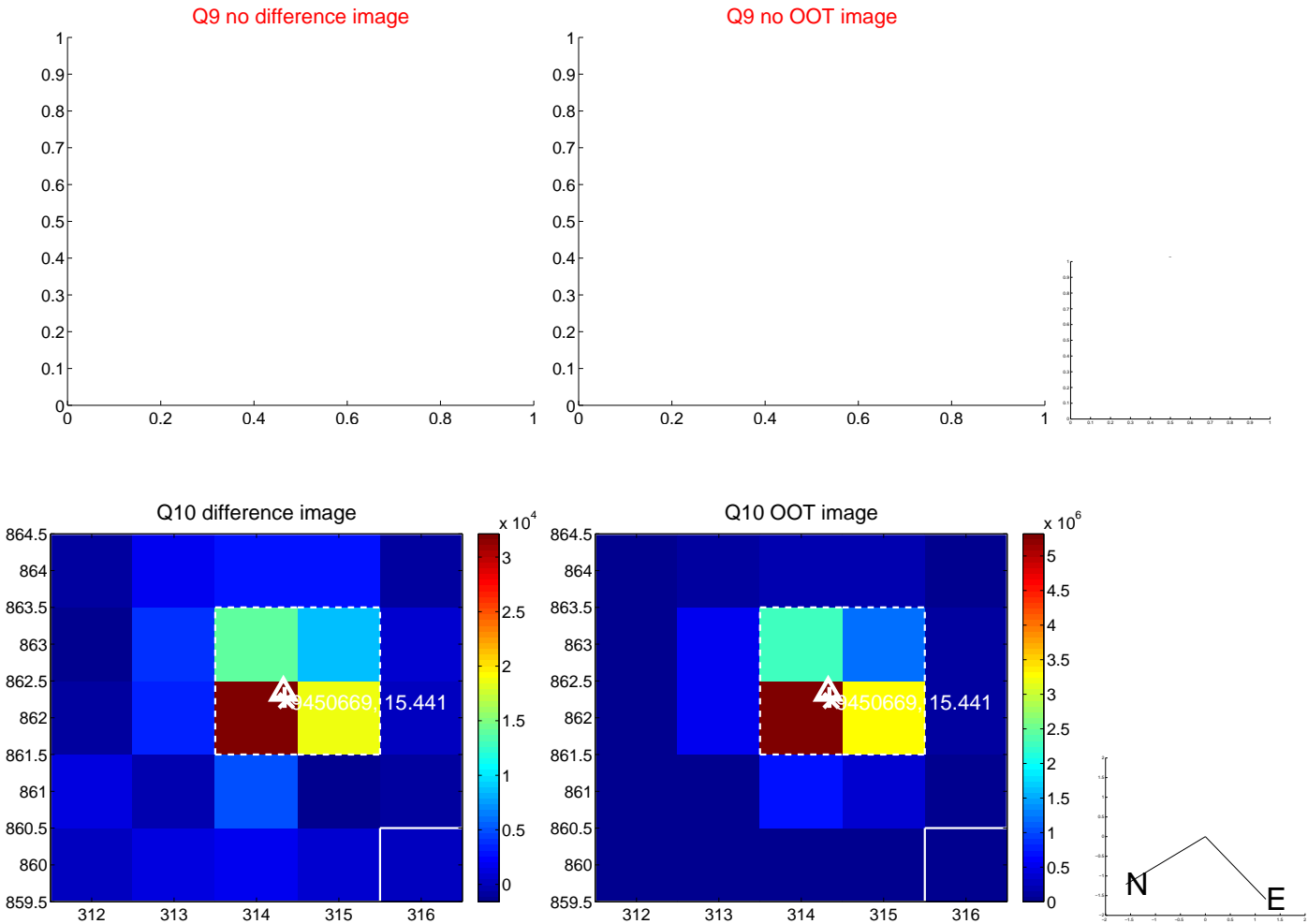
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

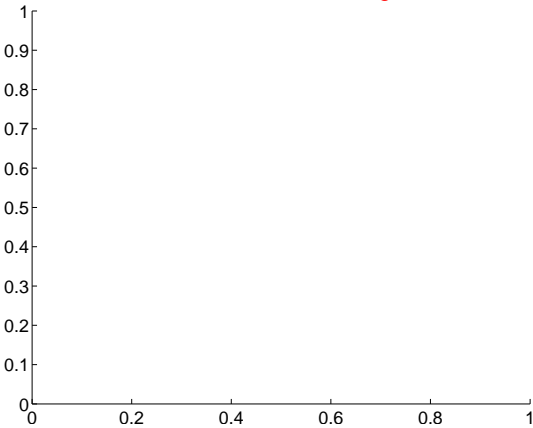


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

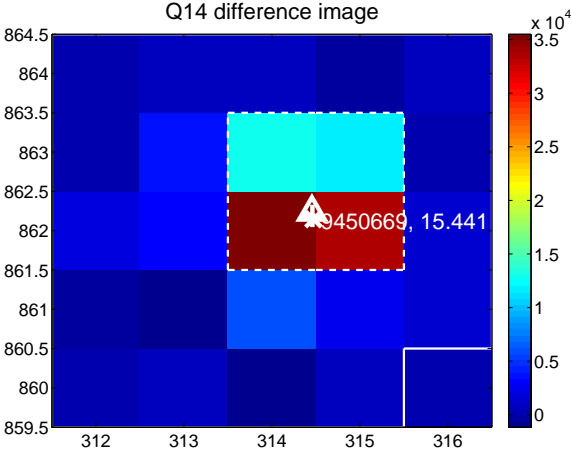
Q13 no difference image



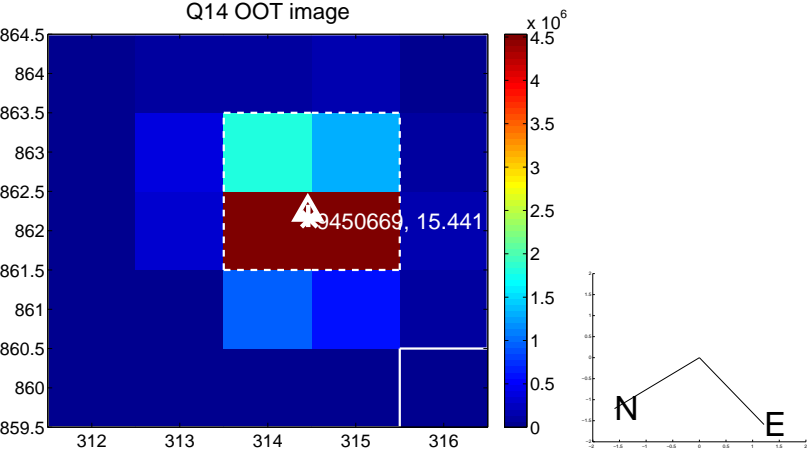
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



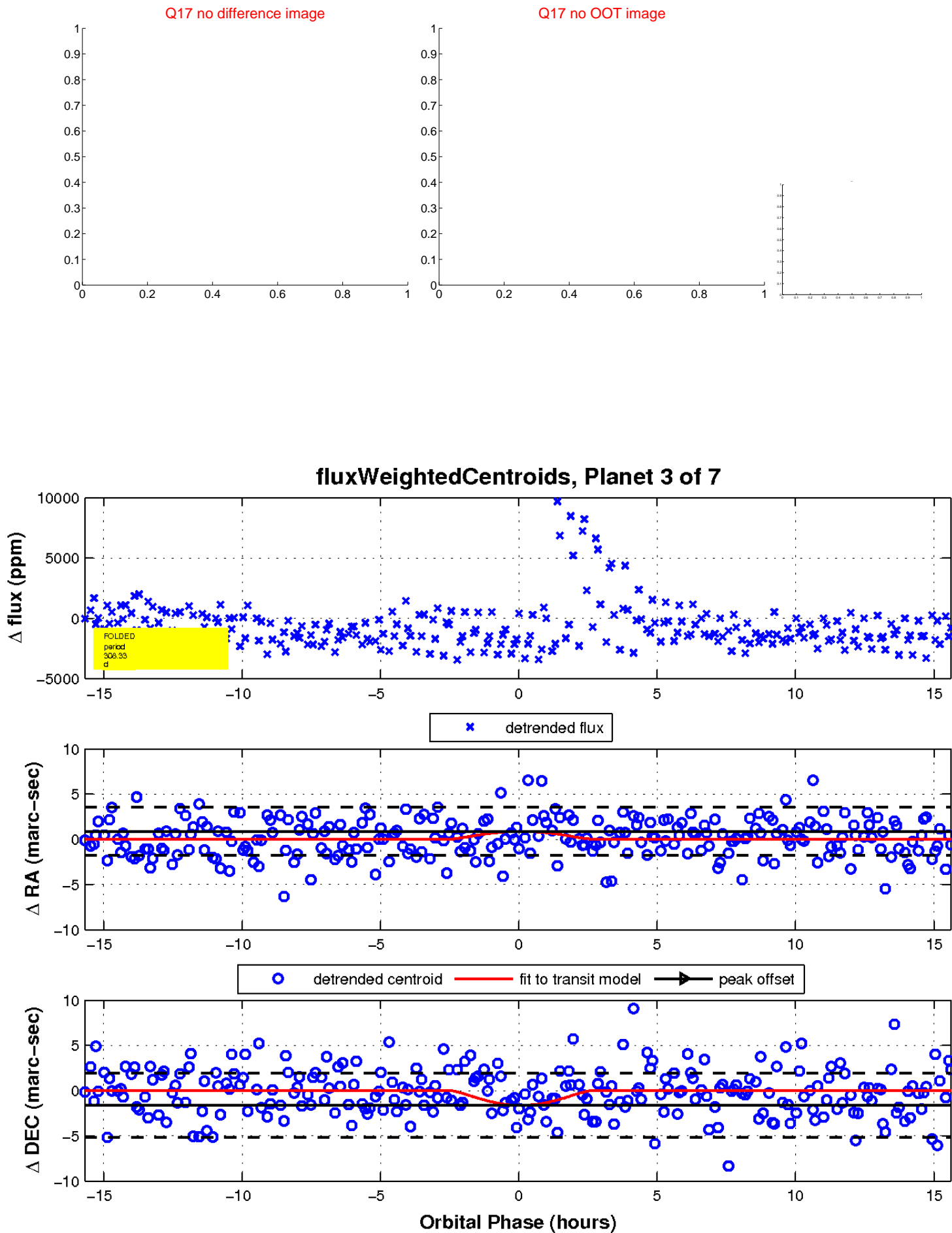
Q16 no difference image



Q16 no OOT image



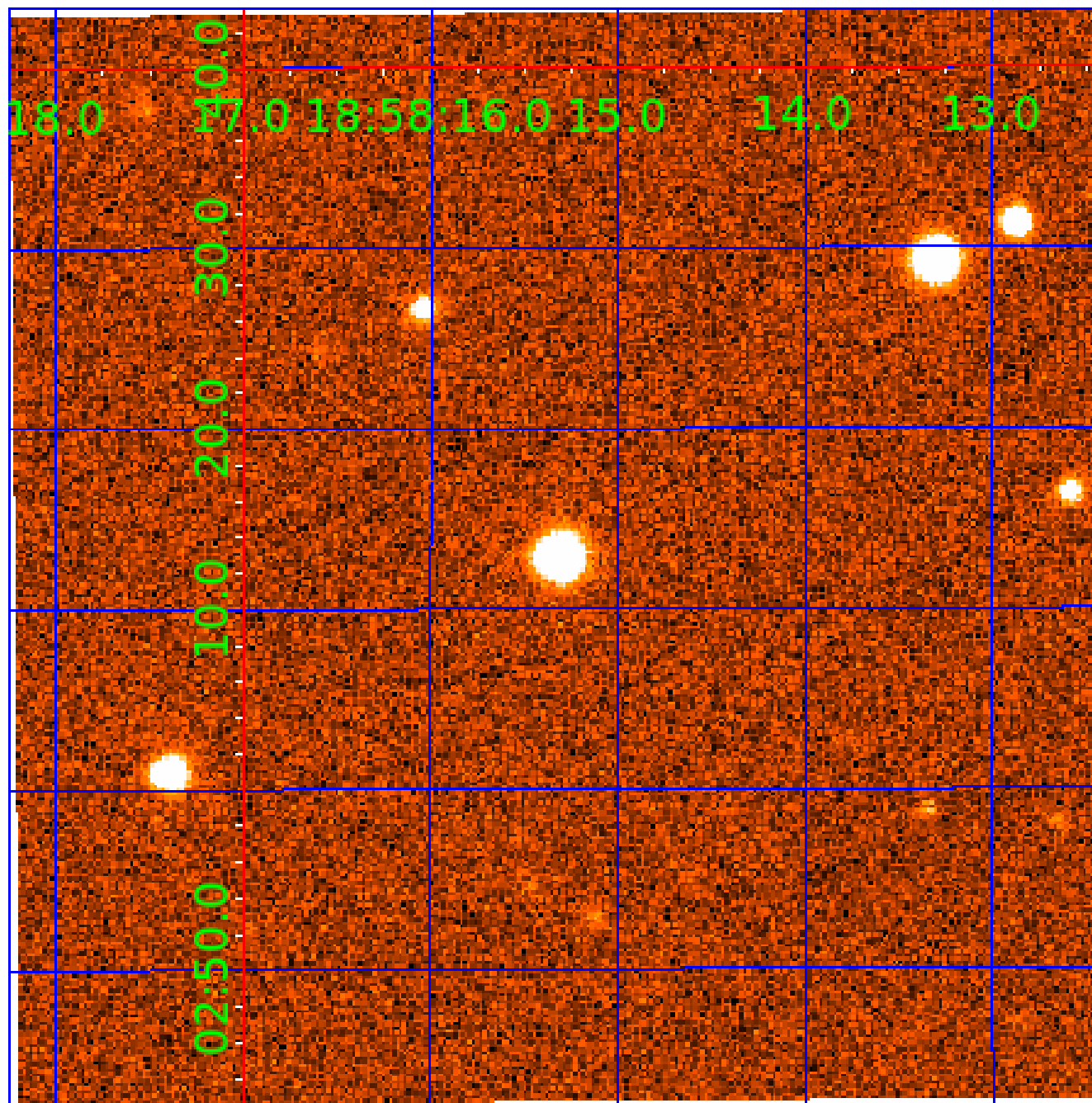
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
009450669-02	OBS	No	478.087940	234.703569	3454.2	12.306	17.3	9.5	0.59	4866	3.94	0.17
009450669-03	OBS	No	308.327828	374.263208	2327.8	5.229	18.0	9.1	0.59	4866	4.63	0.32
009450669-04	OBS	No	545.110344	236.416352	3176.8	4.963	17.3	11.3	0.59	4866	3.68	0.15
009450669-05	OBS	No	639.970752	177.323963	2264.6	4.765	16.7	7.6	0.59	4866	2.90	0.12
009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009450669-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

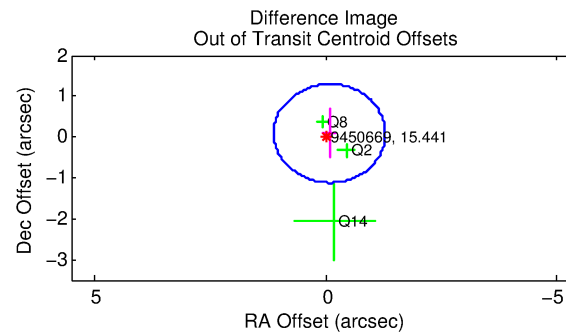
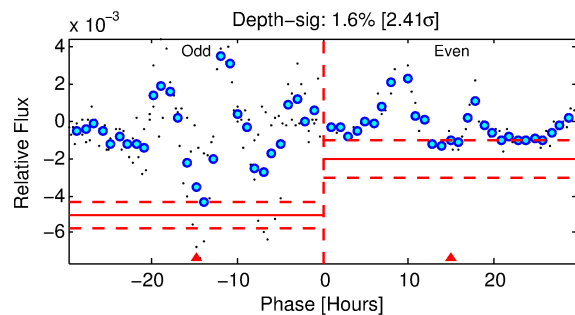
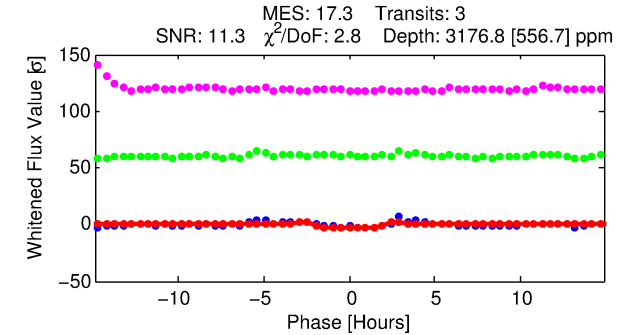
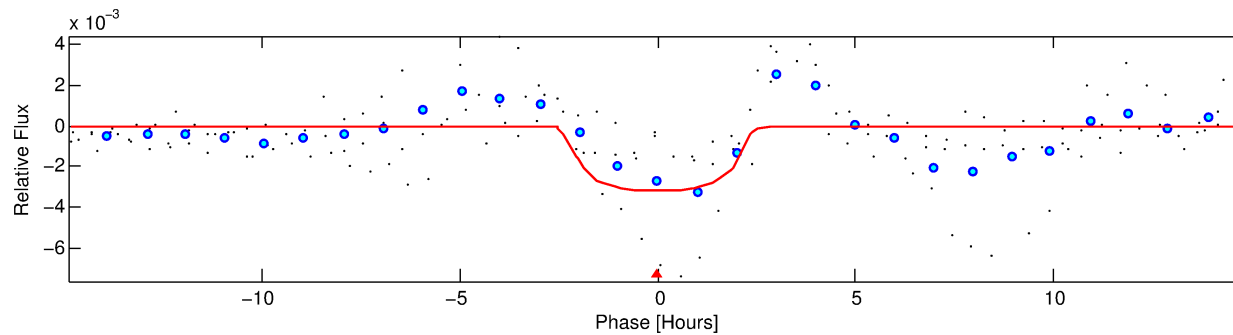
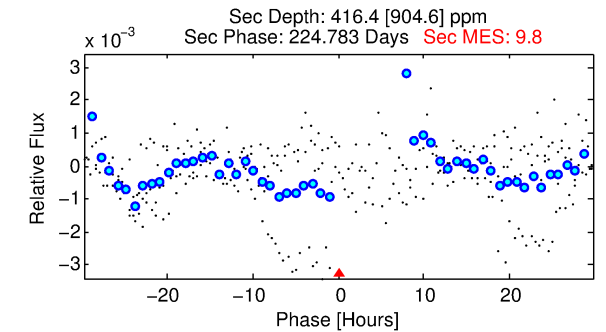
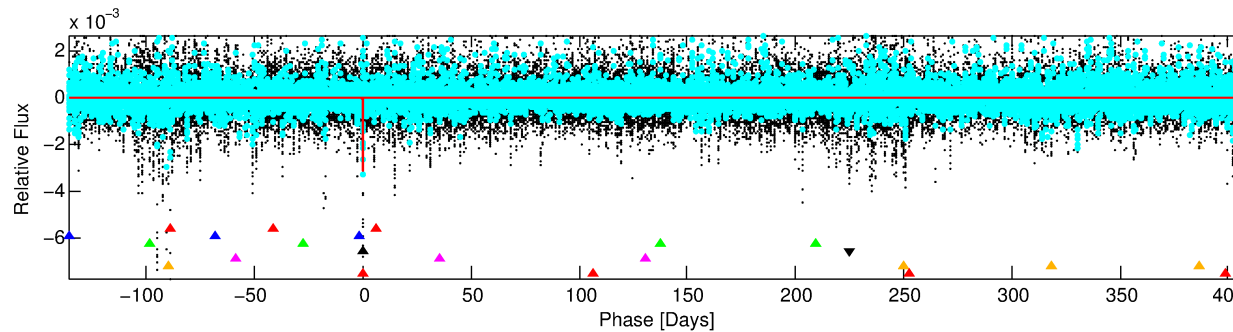
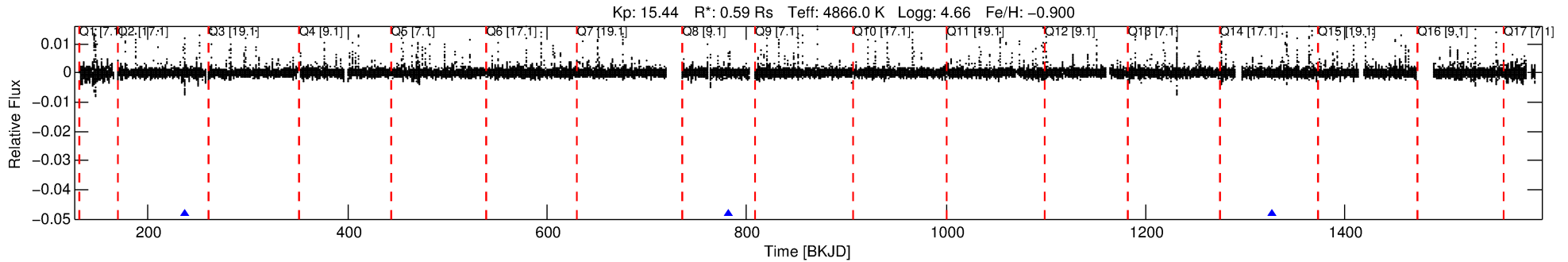
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009450669-04

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 4 of 7 Period: 545.110 d



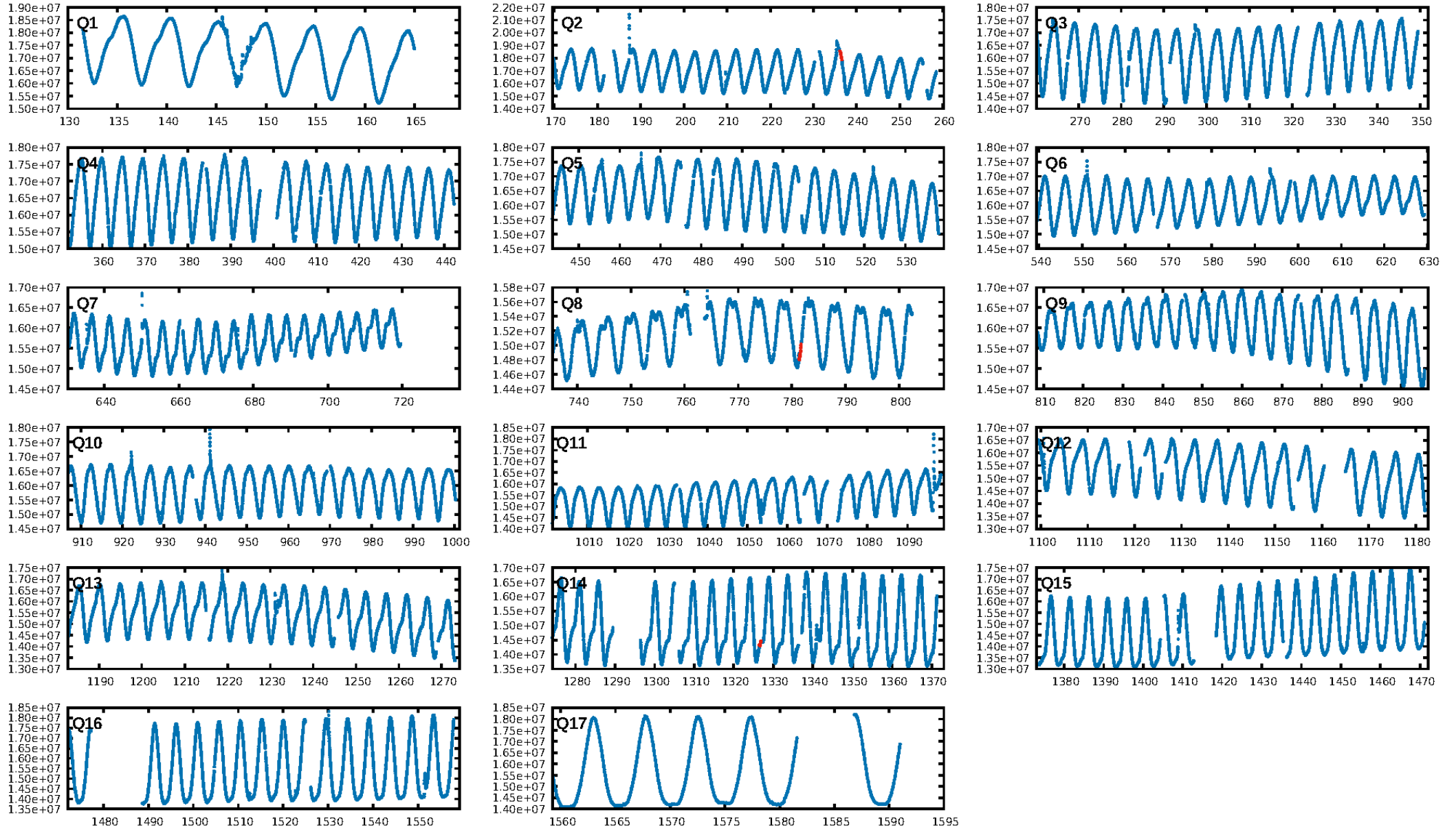
## DV Fit Results:

Period = 545.11034 [0.00703] d  
Epoch = 236.4164 [0.0097] BKJD  
Rp/R\* = 0.0569 [0.0122]  
a/R\* = 602.99 [391.71]  
b = 0.78 [0.33]  
Seff = 0.15 [0.02]  
Teq = 158 [6] K  
Rp = 3.68 [0.85] Re  
a = 1.0949 [0.0745] AU  
Ag = 20253.73 [44896.87] [0.45σ]  
Teffp = 2914 [1616] K [1.71σ]

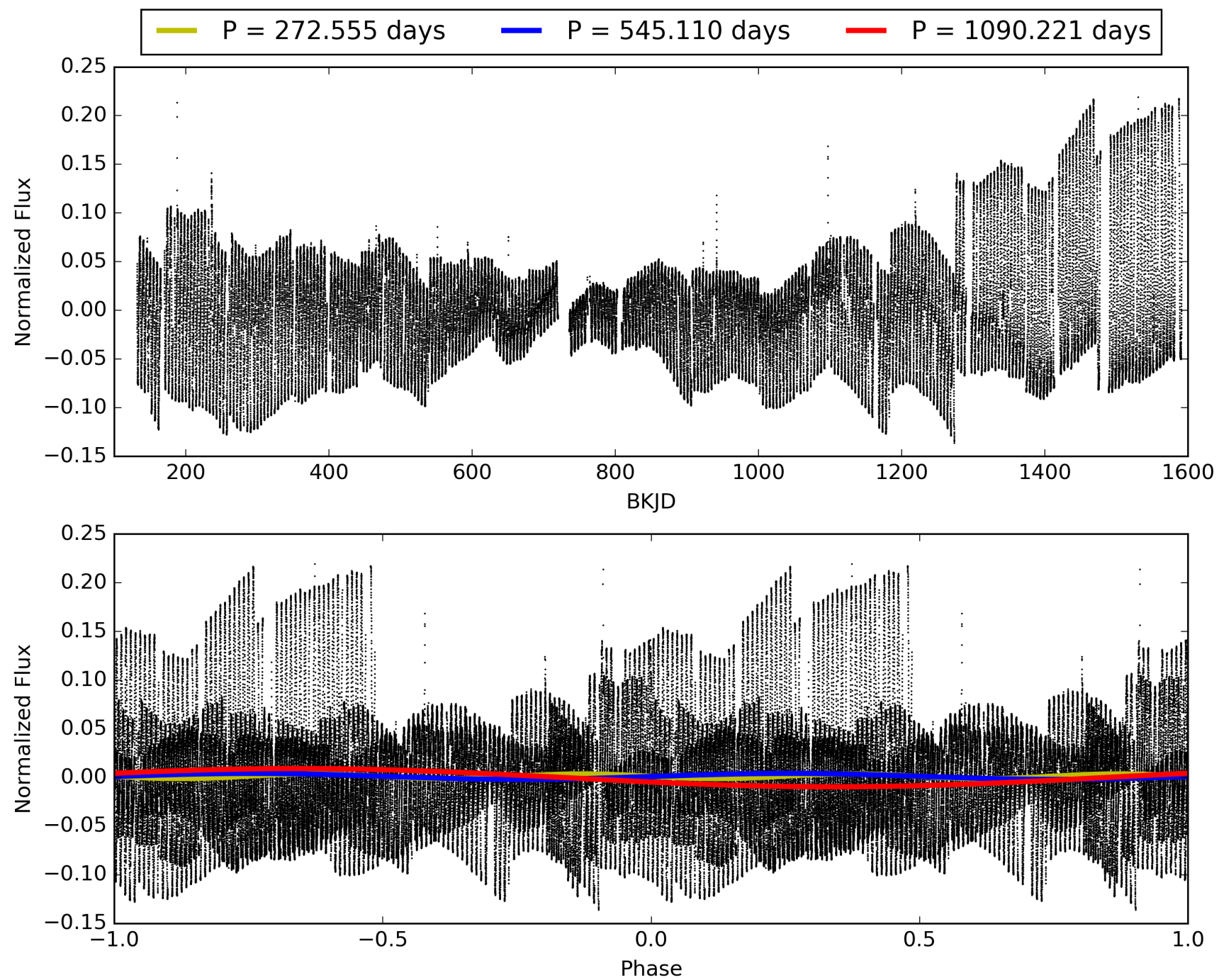
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [121.23σ]  
LongPeriod-sig: 100.0% [155.84σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.4716  
Centroid-sig: 1.1%  
Centroid-so: 0.629 arcsec [1.44σ]  
OotOffset-rm: 0.123 arcsec [0.31σ]  
KicOffset-rm: 0.139 arcsec [0.46σ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.67 [2/3]

# TCE 009450669-04, PDC Light Curves

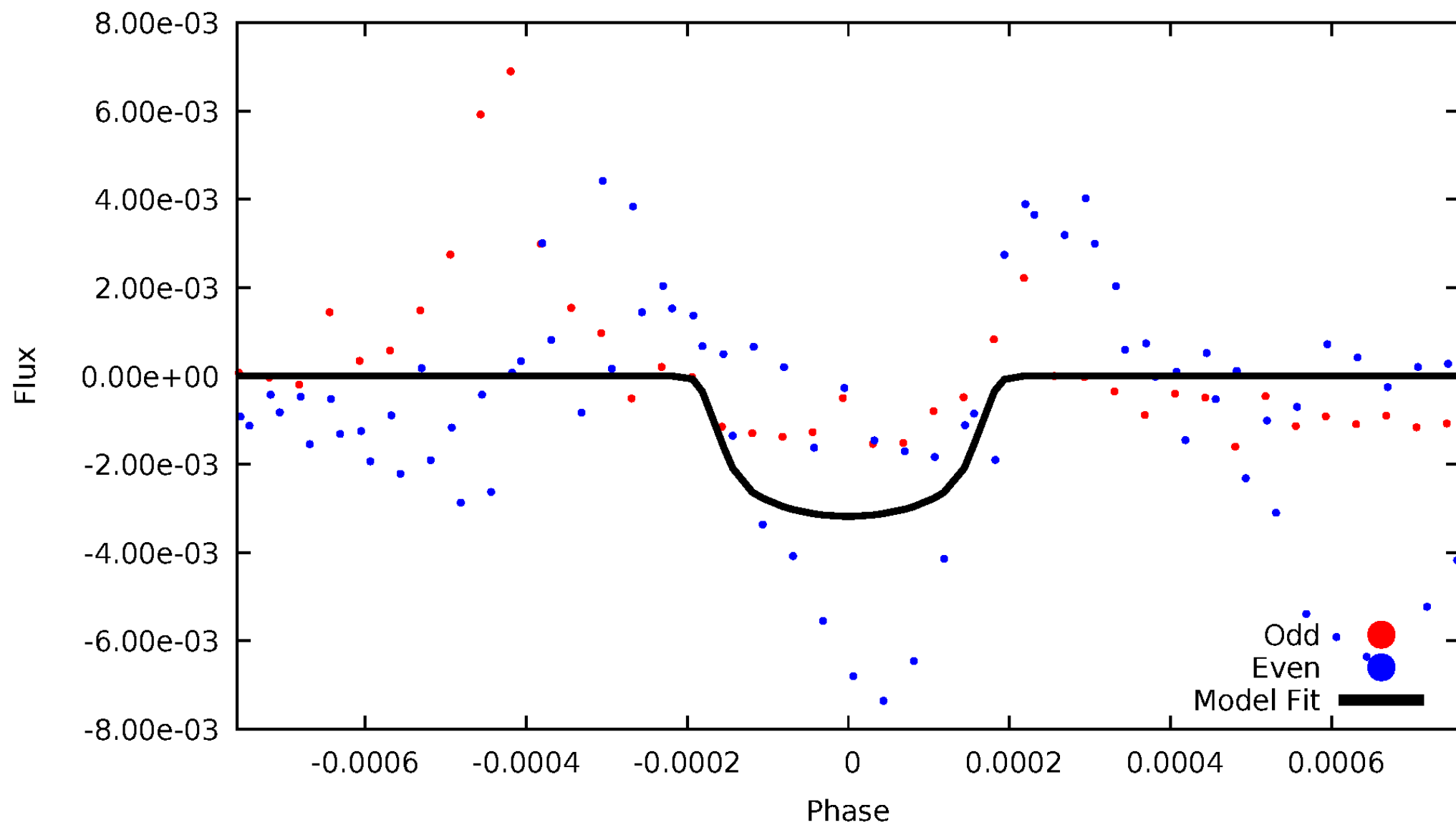


TCE 009450669-04



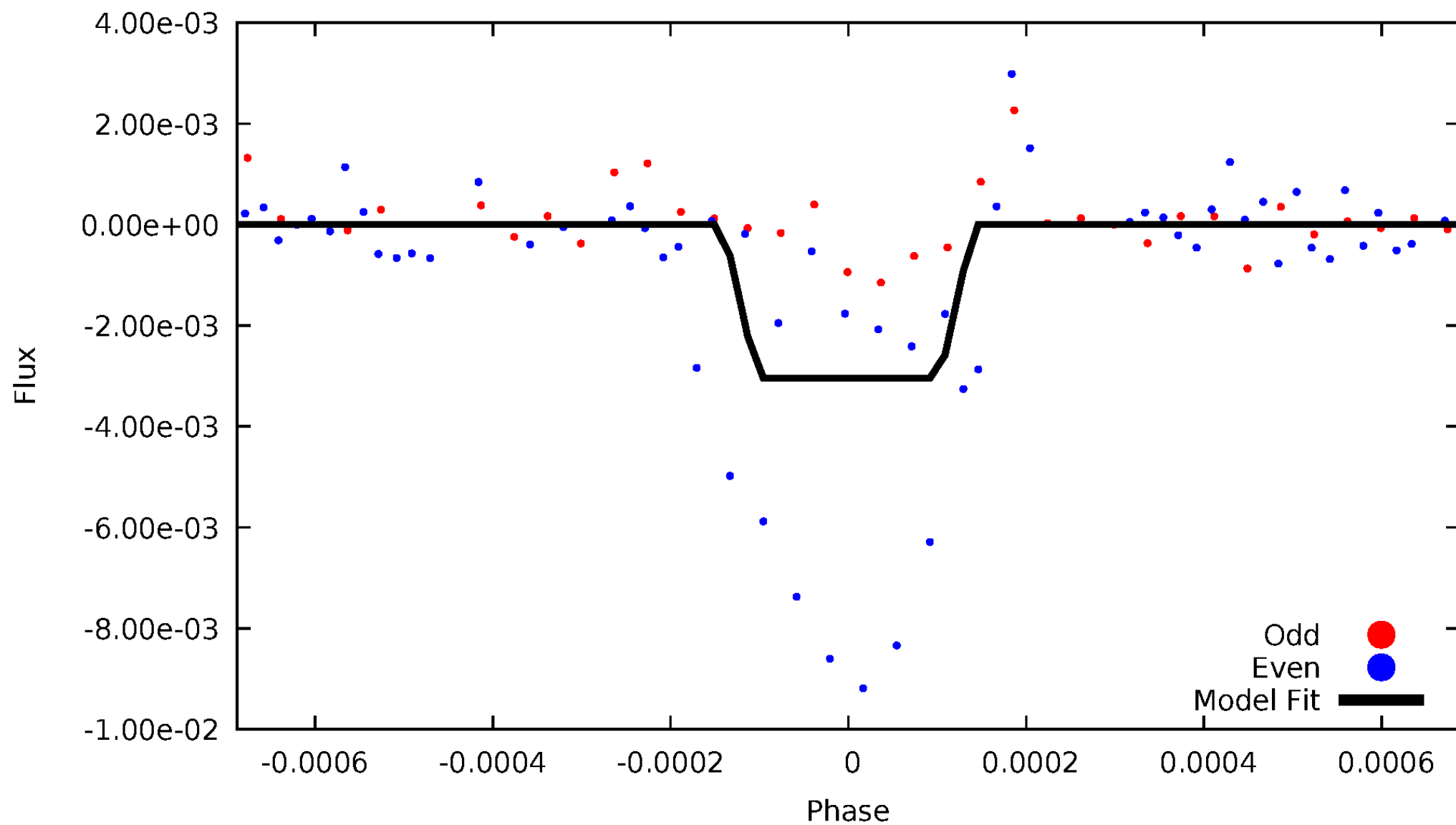
# DV Odd/Even

TCE 009450669-04



# ALT Odd/Even

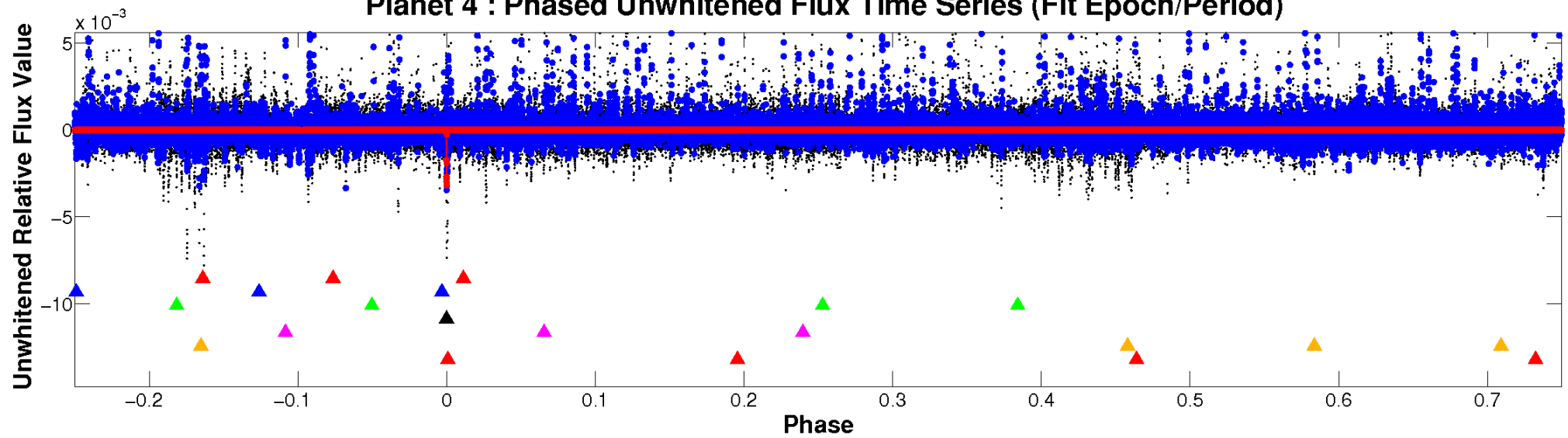
TCE 009450669-04



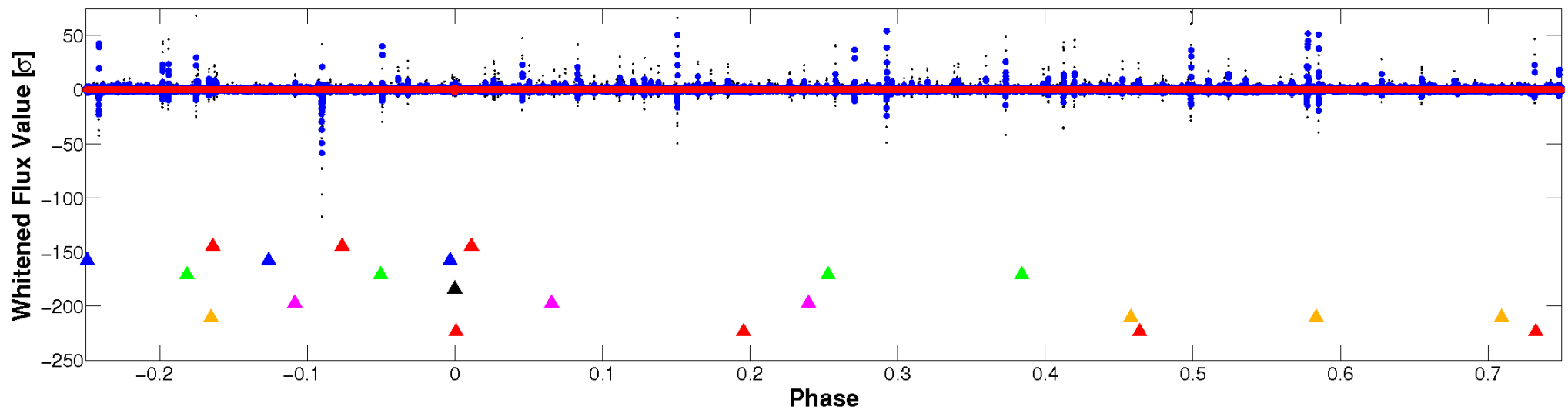


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



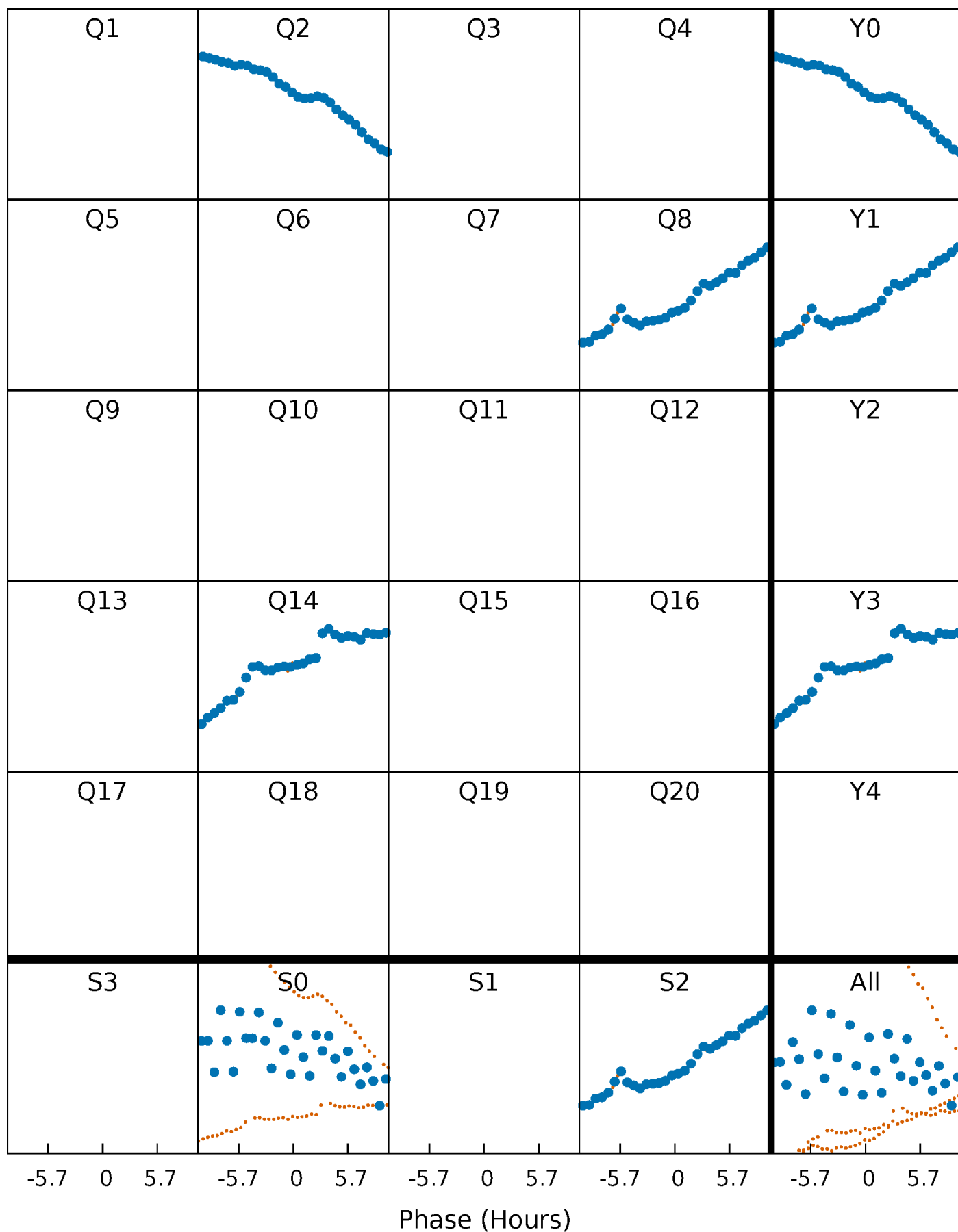
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





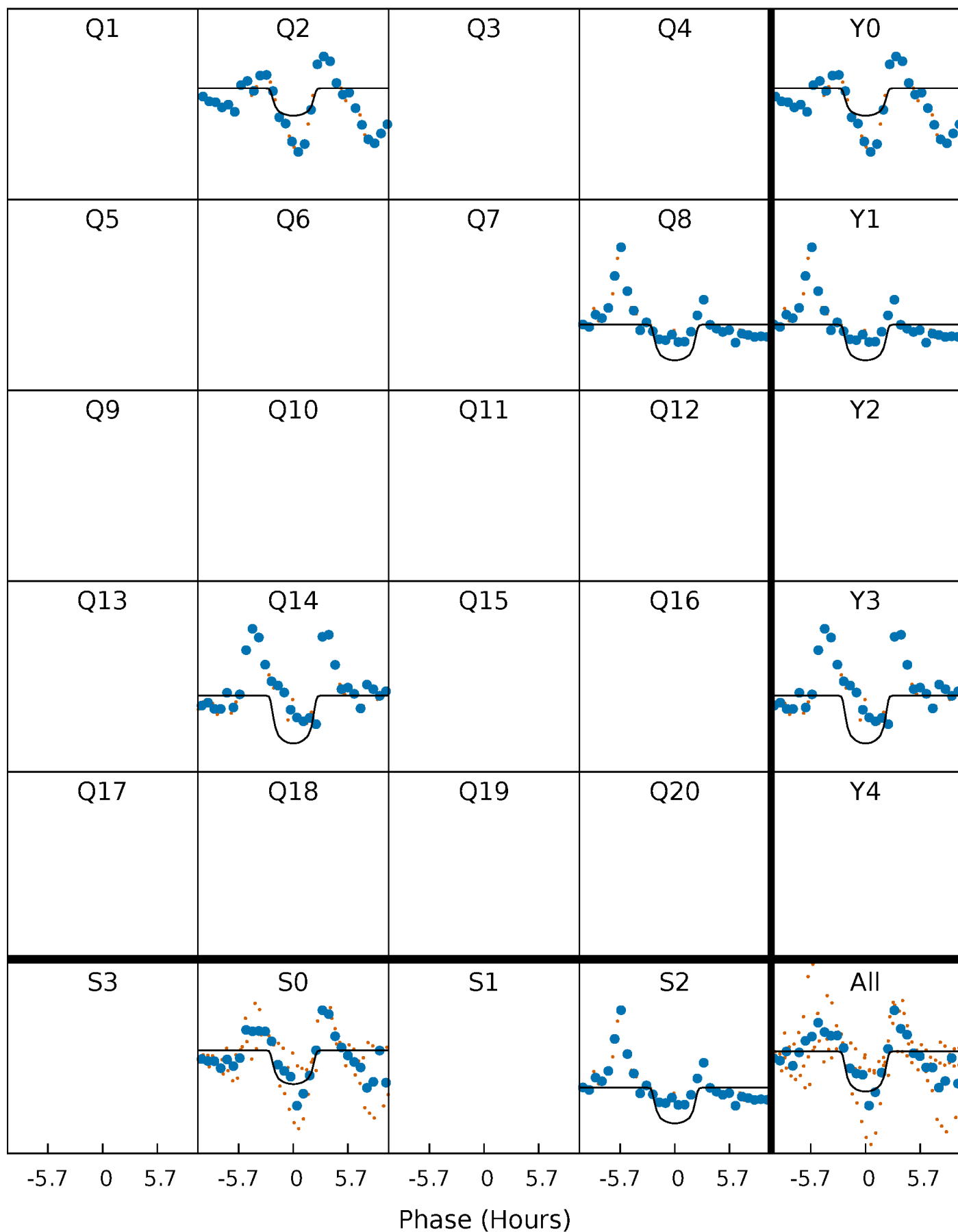
# PDC Quarter-Phased Transit Curves

TCE 009450669-04 P=545.110344 Days  $T_0=236.416352$  (BKJD)



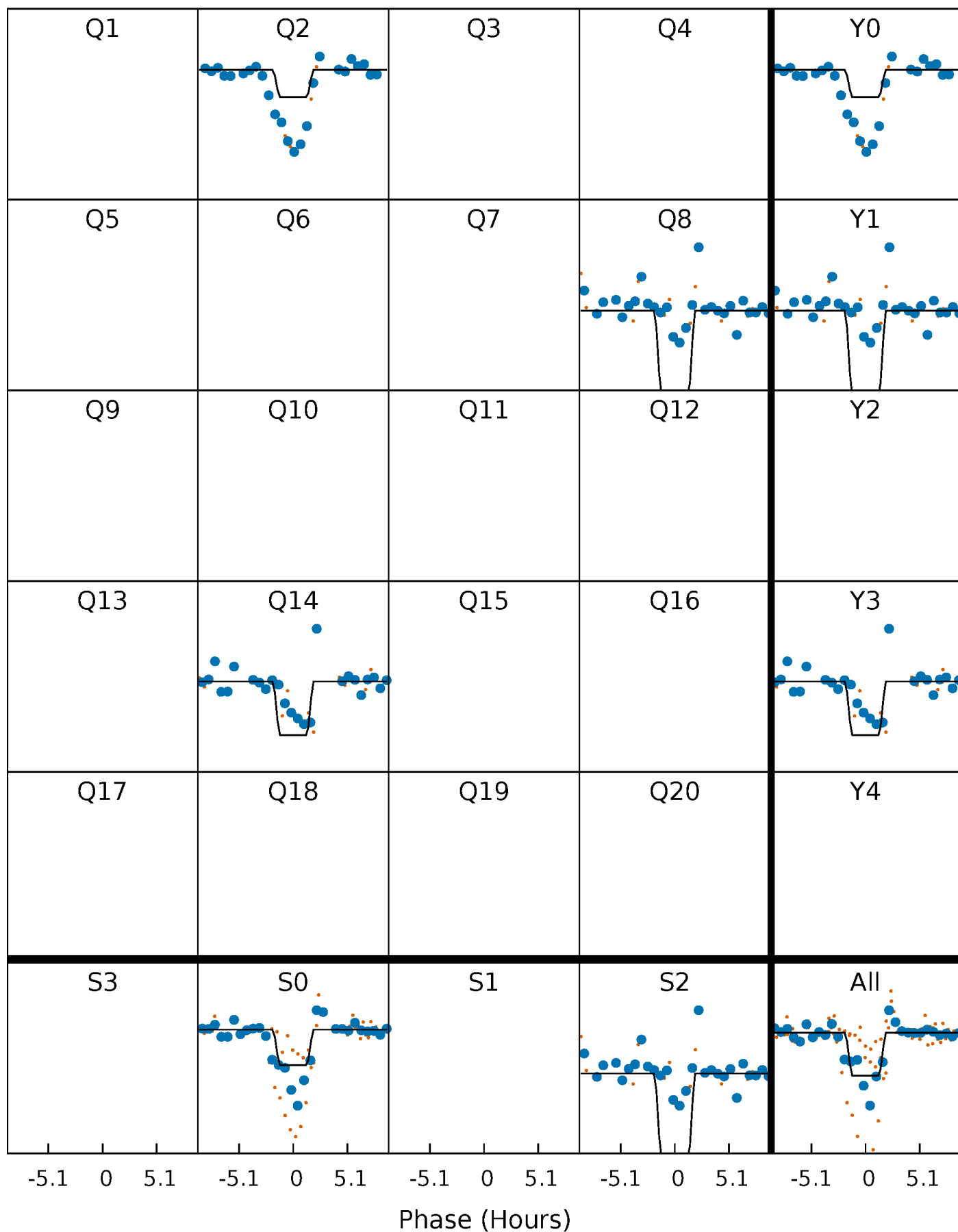
# DV Quarter-Phased Transit Curves

TCE 009450669-04 P=545.110344 Days  $T_0=236.416352$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

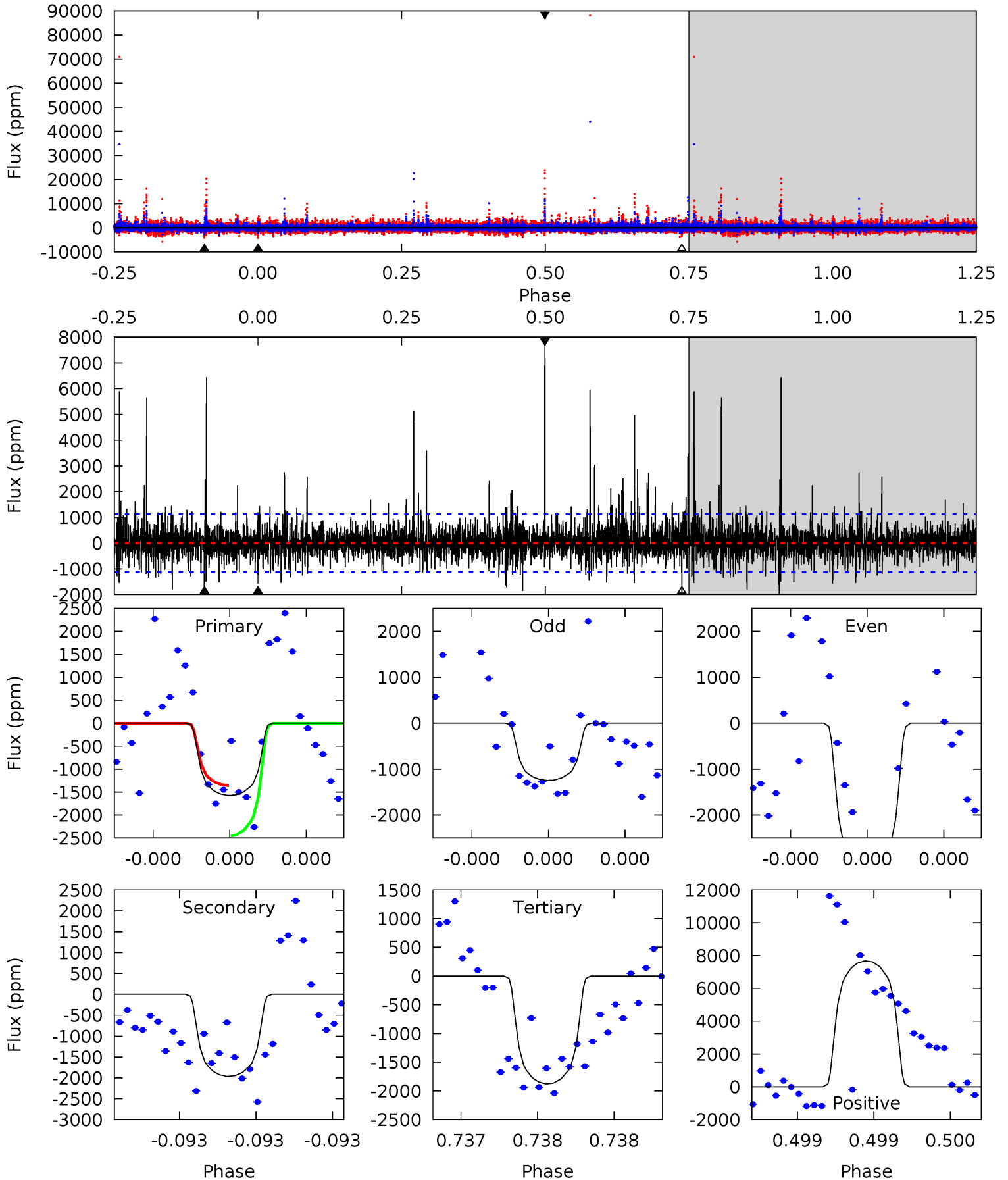
TCE 009450669-04     $P=545.112891$  Days     $T_0=236.430983$  (BKJD)



# DV Model-Shift Uniqueness Test

009450669-04, P = 545.110344 Days, E = 236.416352 Days

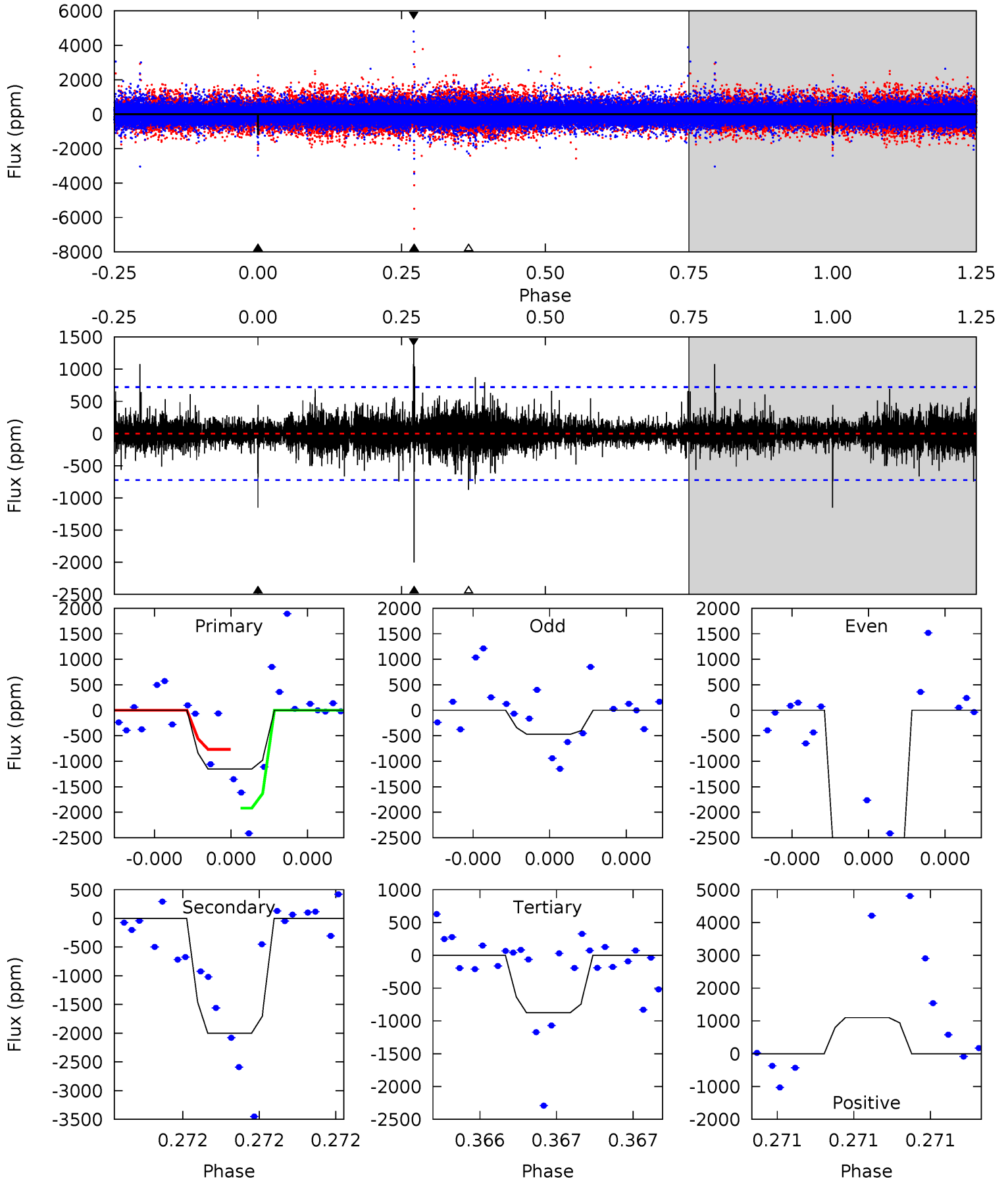
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.88	9.84	9.40	38.4	5.62	3.55	2.61	-1.52	-30.6	0.43	-28.6	2.47	2.03	0.80	2.73



# Alt Model-Shift Uniqueness Test

009450669-04, P = 545.112891 Days, E = 236.430983 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.05	15.7	6.87	8.65	5.68	3.65	1.02	2.18	0.41	8.87	7.10	16.6	1.96	0.41	4.15



### Stellar Parameters For KIC 009450669

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1966 \pm 200$	$3.70^{+0.76}_{-0.79}$	$220^{+8}_{-8}$	$4419^{+405}_{-333}$	$96630^{+58498}_{-30366}$
Alt.	$-2003 \pm 127$	$3.57^{+0.79}_{-0.88}$	$220^{+8}_{-8}$	$4470^{+526}_{-332}$	$105784^{+75985}_{-36376}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

## DV Centroid Data

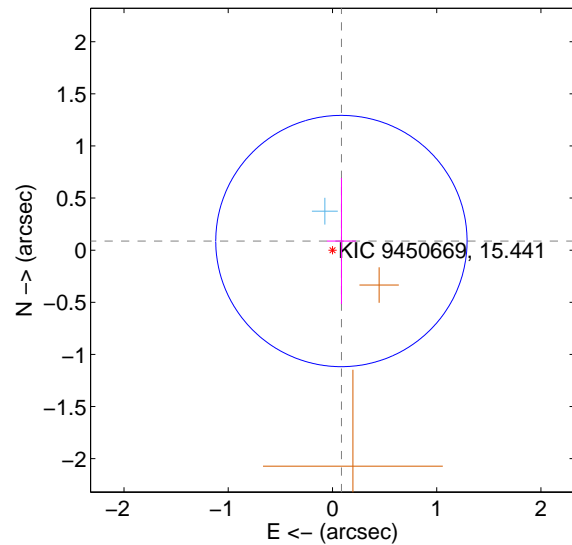
Supplemental centroid analysis for 009450669-04. Kepler magnitude: 15.44. Transit SNR 11.25

There are 1 quarters with good PRF difference image offsets

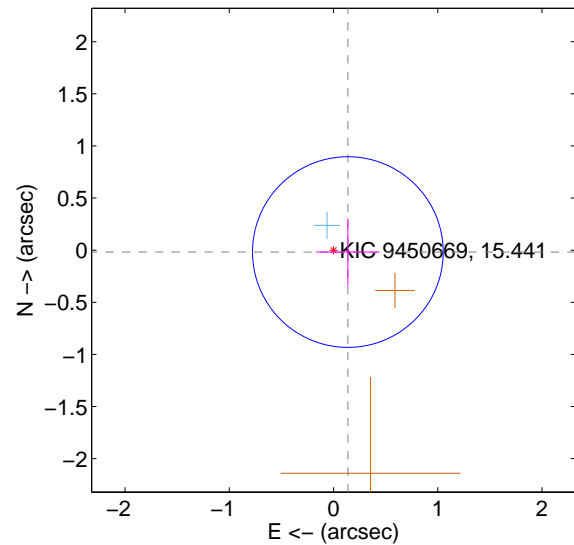
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.123 \pm 0.402$	0.31	$-0.086 \pm 0.139$	$0.088 \pm 0.605$
PRF-fit source offset from KIC position	$0.139 \pm 0.305$	0.46	$-0.138 \pm 0.305$	$-0.018 \pm 0.323$
photometric centroid source offset	$0.63 \pm 0.44$	1.44	$0.08 \pm 0.40$	$0.62 \pm 0.44$

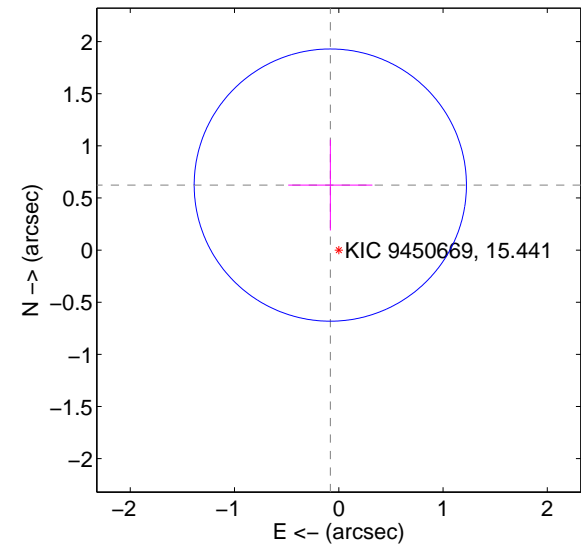
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

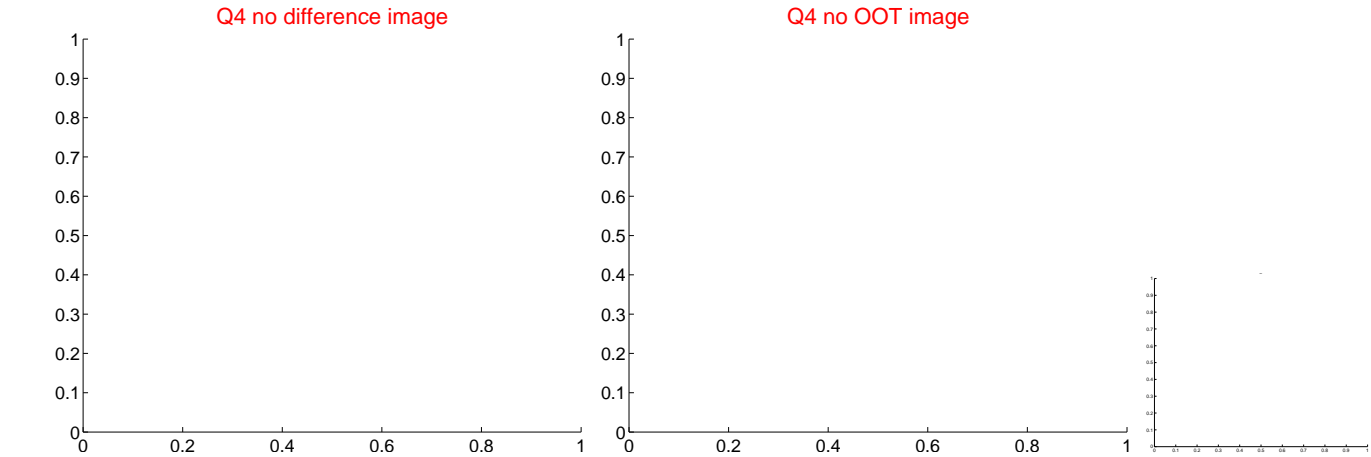
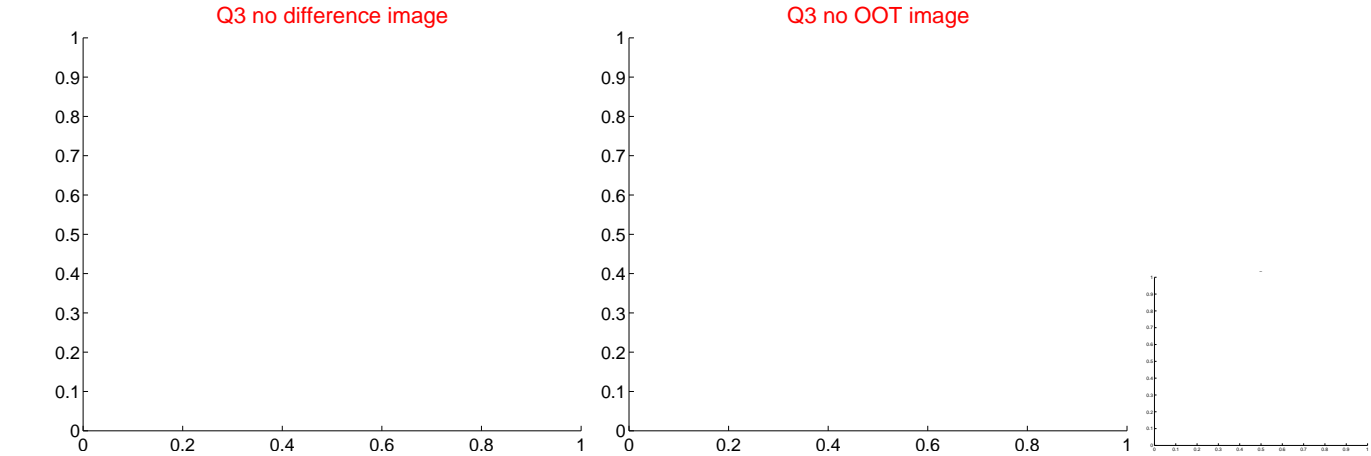
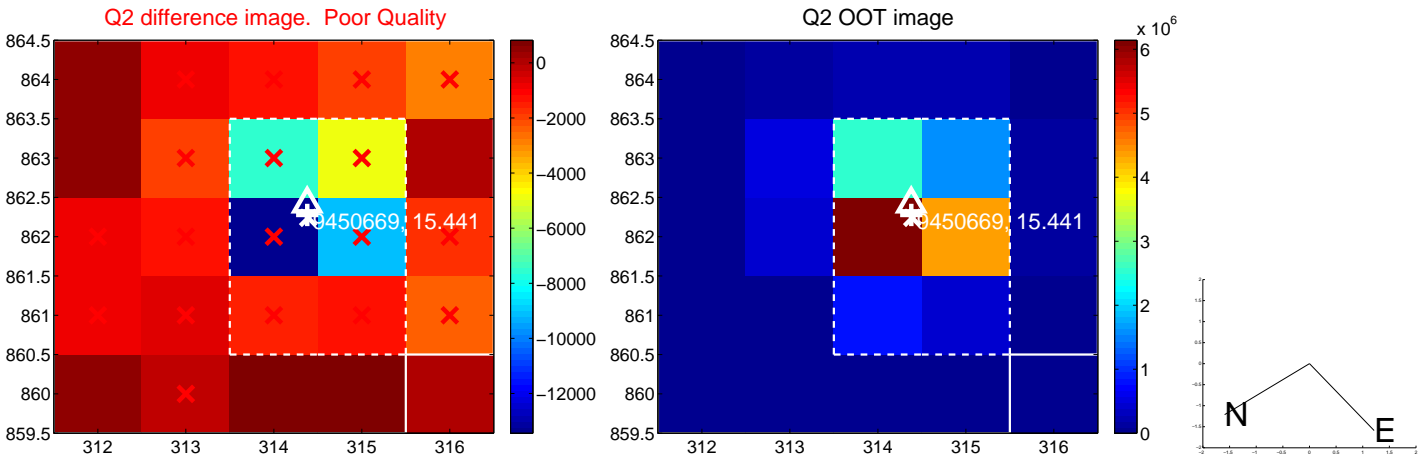
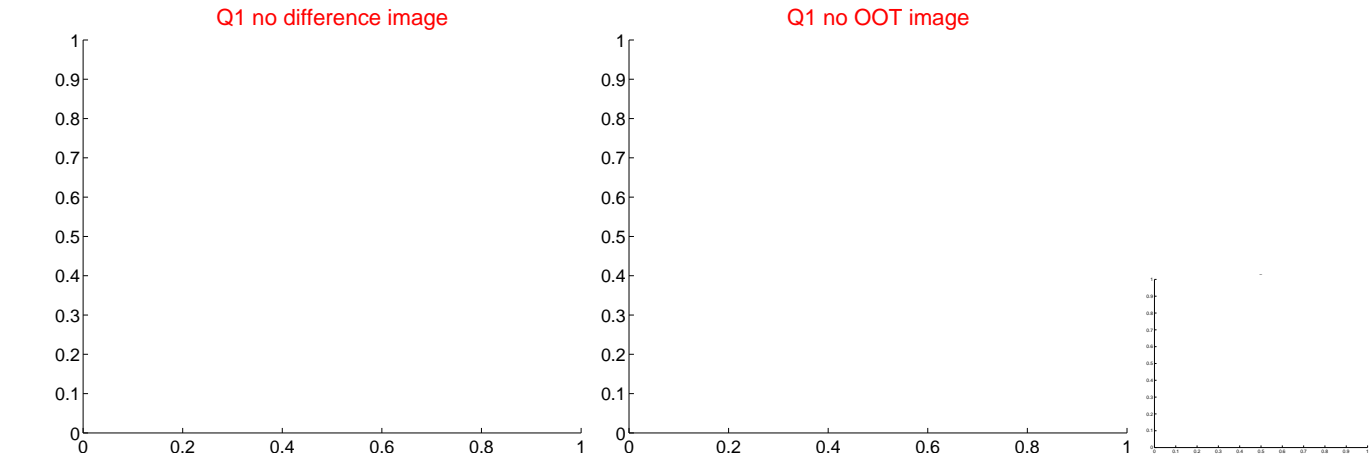


offset from photometric centroids



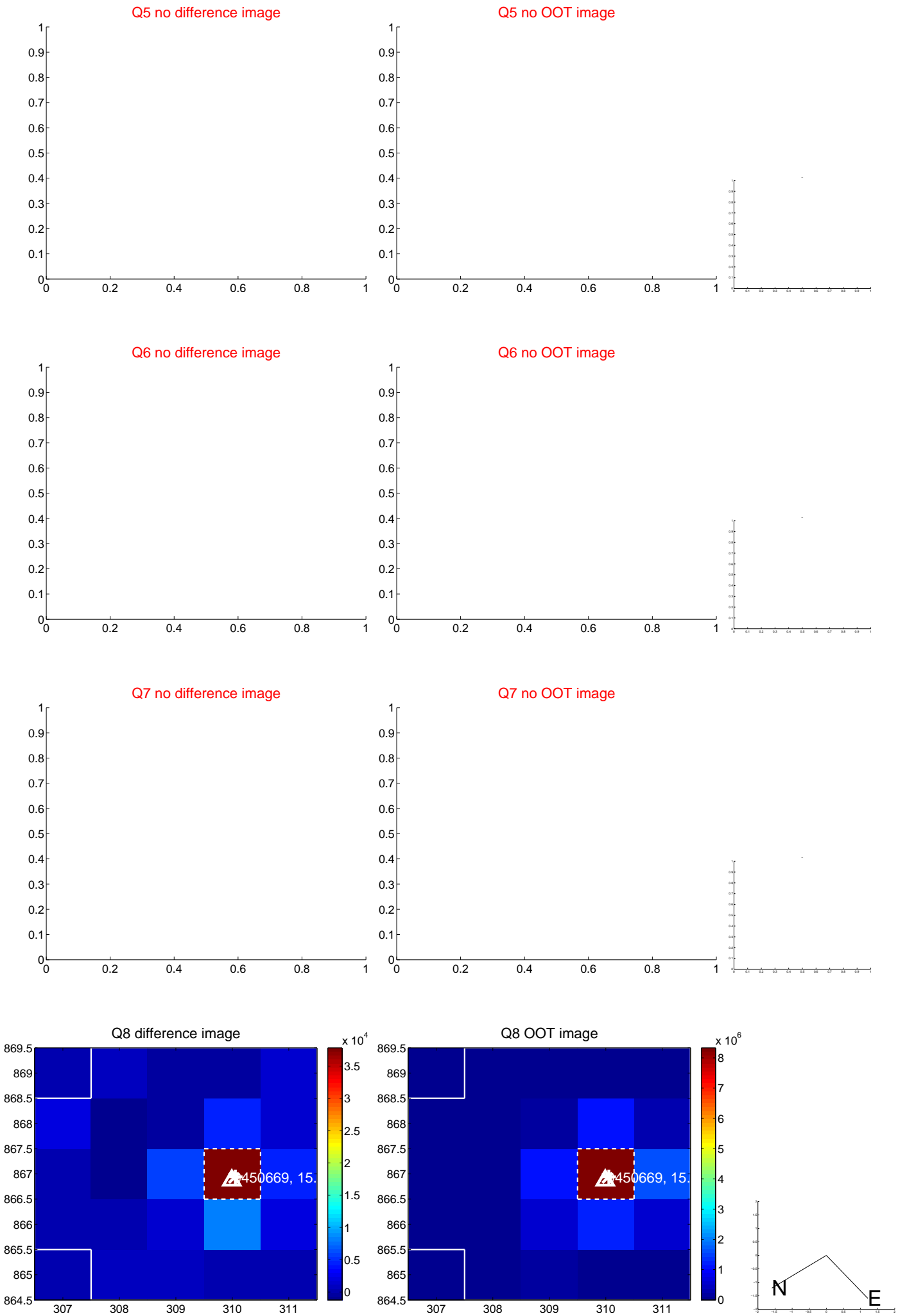
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





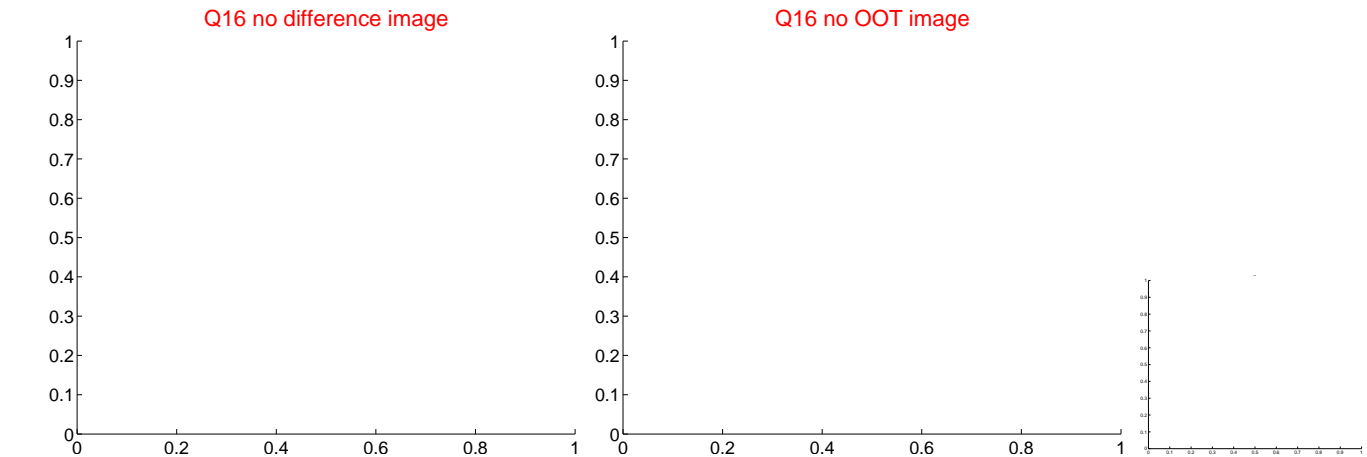
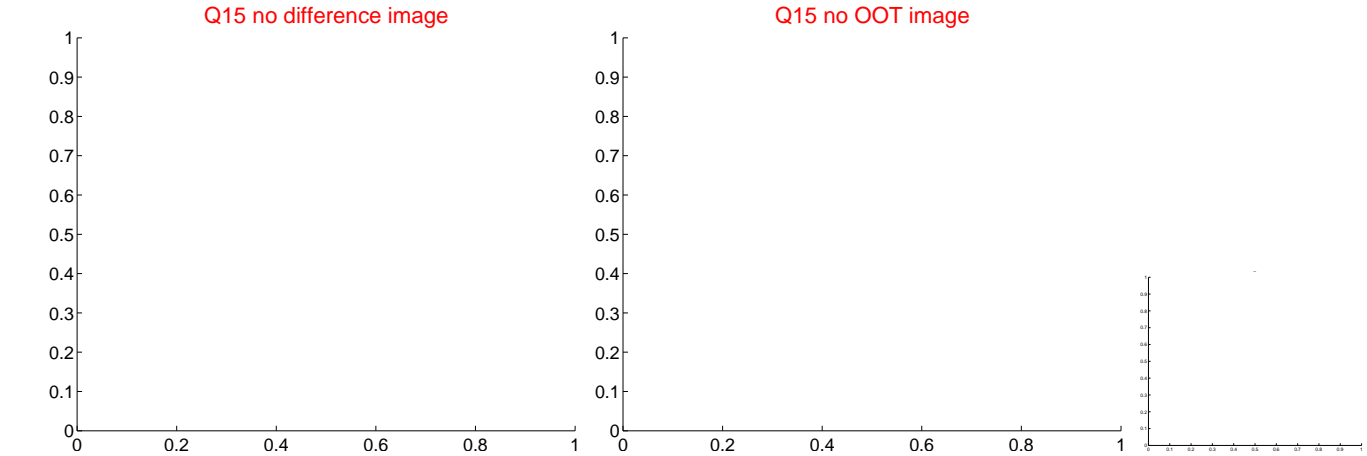
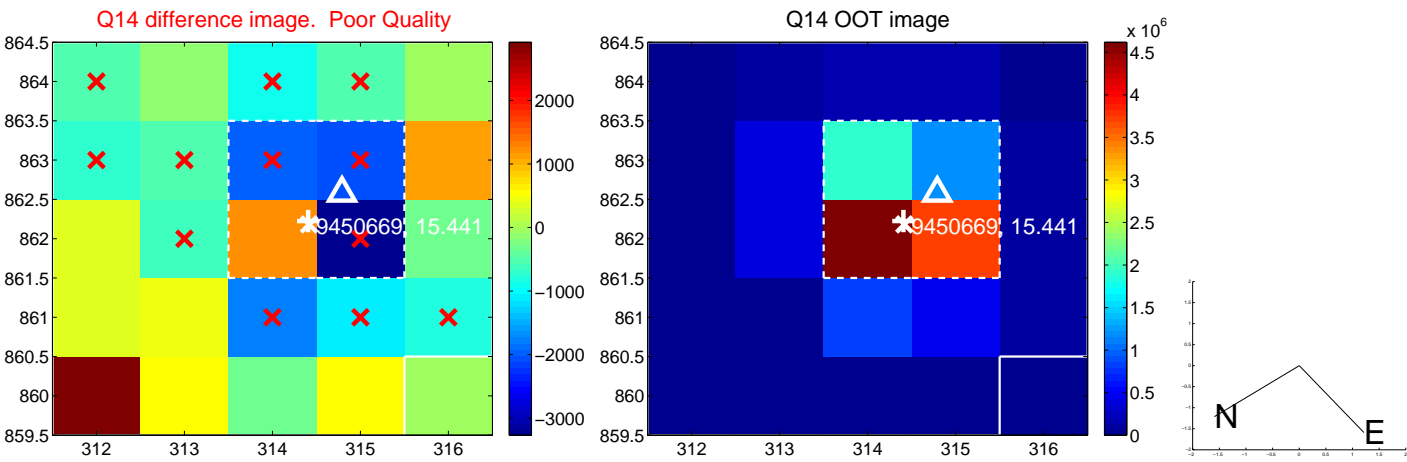
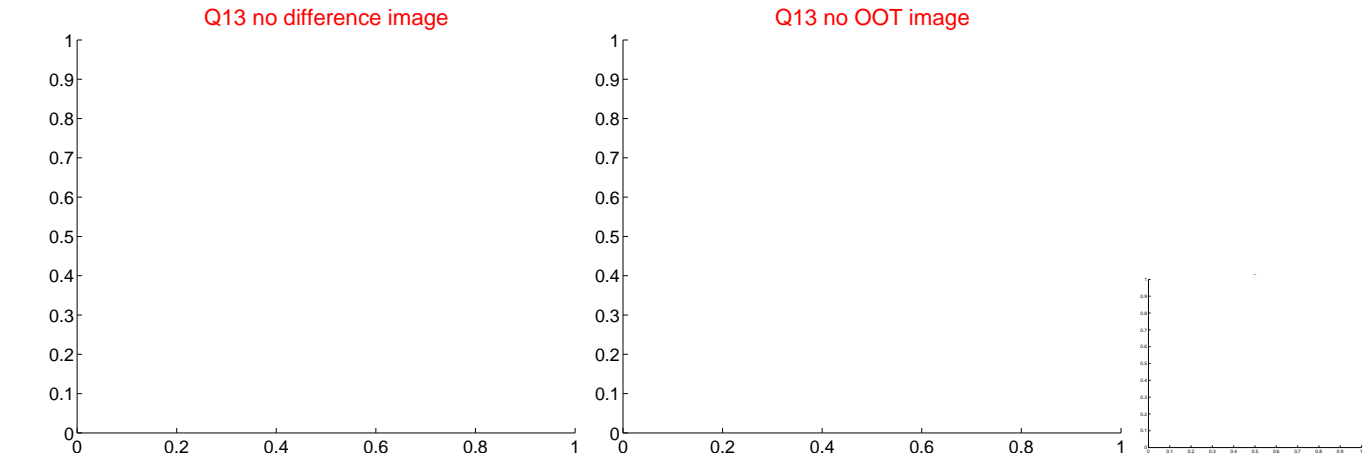
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



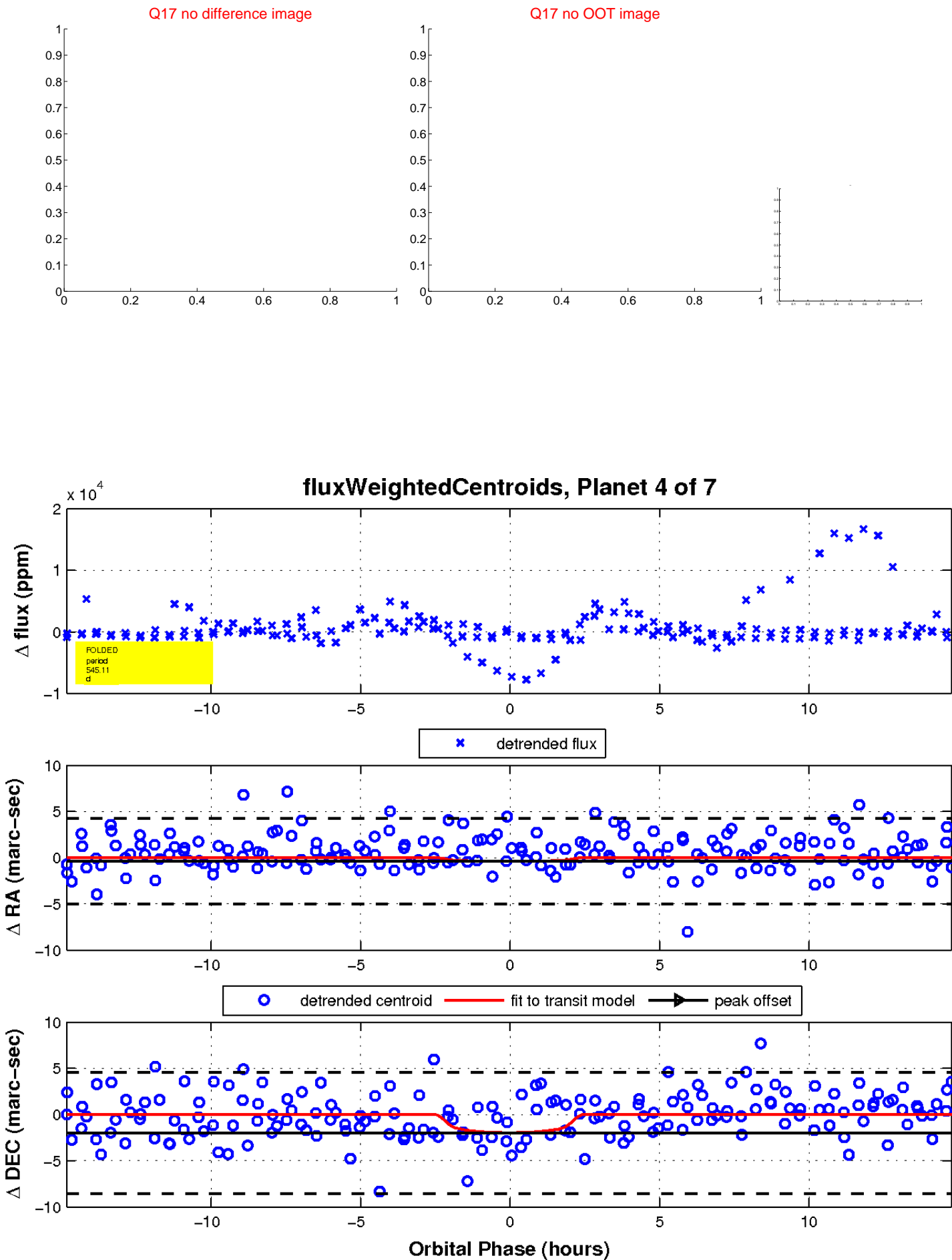
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

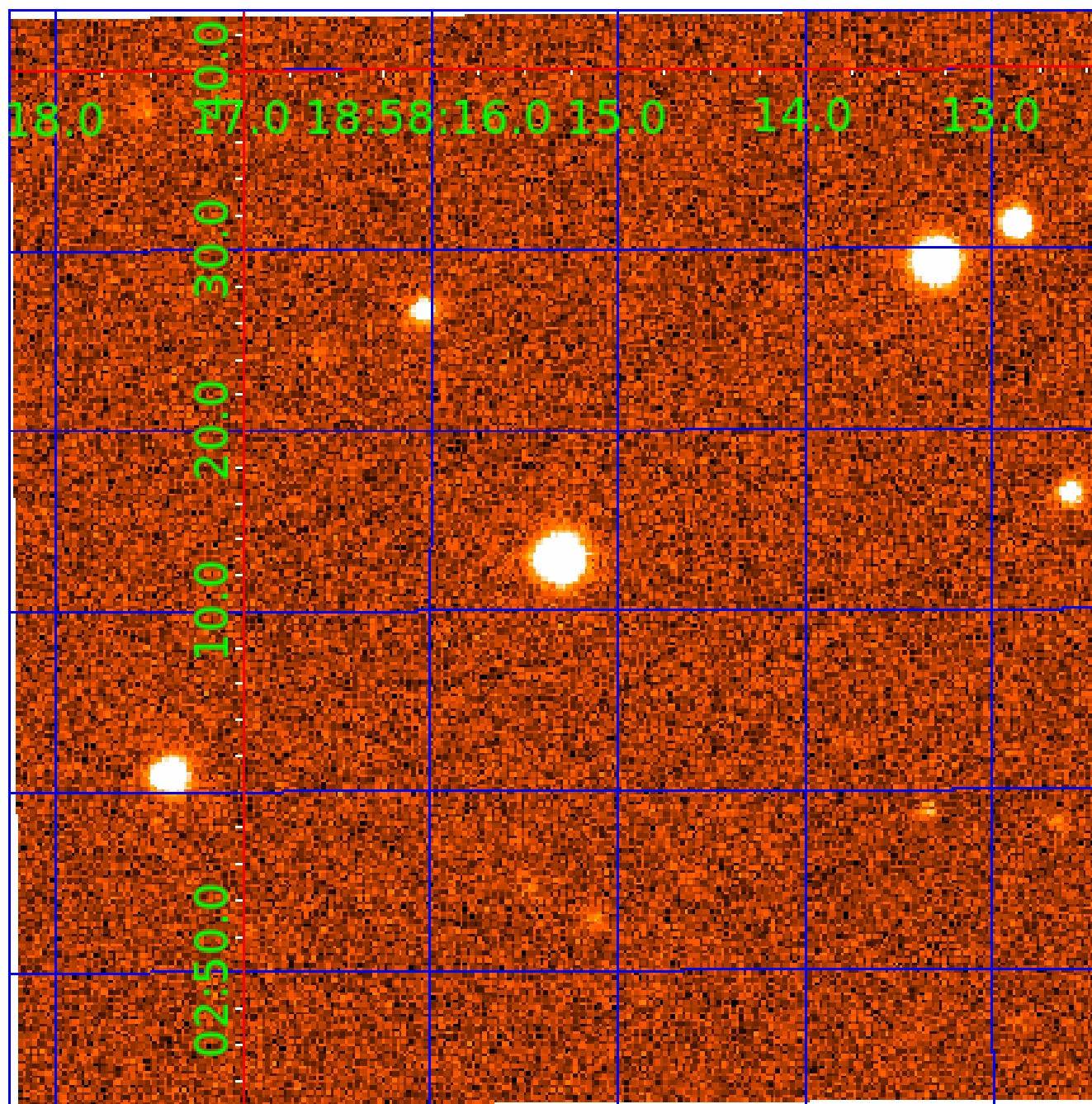


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
009450669-02	OBS	No	478.087940	234.703569	3454.2	12.306	17.3	9.5	0.59	4866	3.94	0.17
009450669-03	OBS	No	308.327828	374.263208	2327.8	5.229	18.0	9.1	0.59	4866	4.63	0.32
009450669-04	OBS	No	545.110344	236.416352	3176.8	4.963	17.3	11.3	0.59	4866	3.68	0.15
009450669-05	OBS	No	639.970752	177.323963	2264.6	4.765	16.7	7.6	0.59	4866	2.90	0.12
009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009450669-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

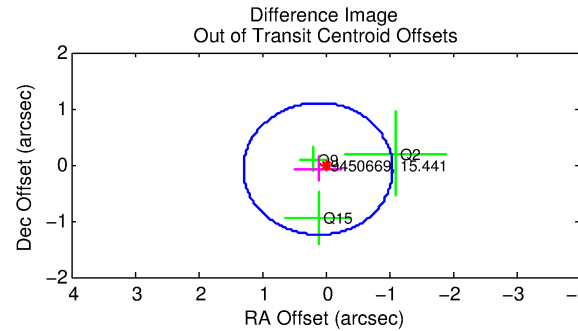
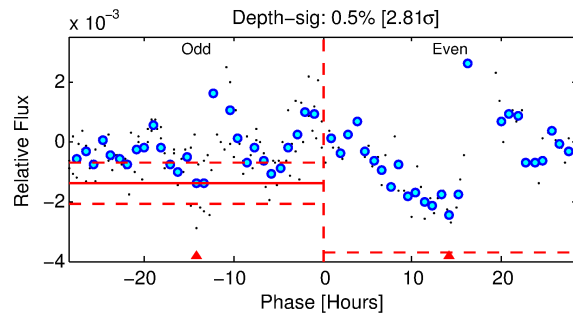
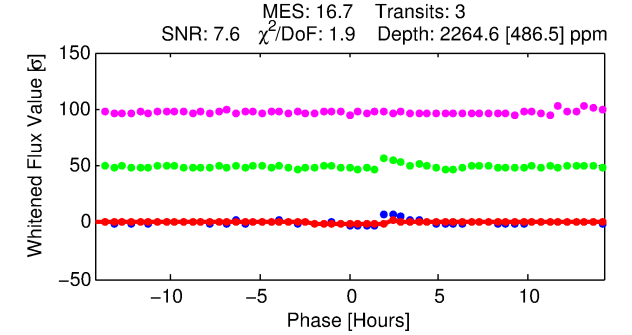
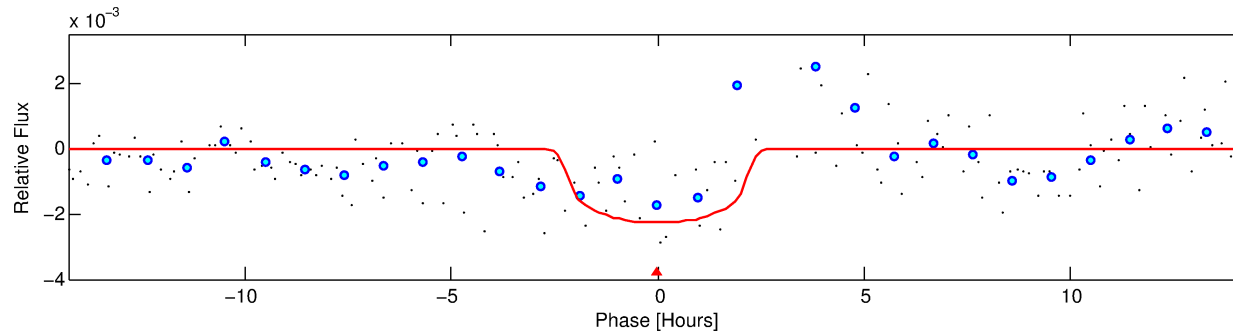
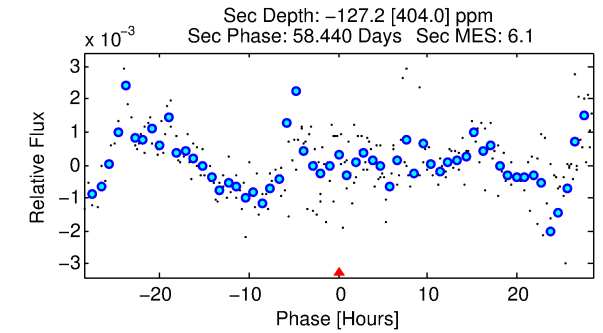
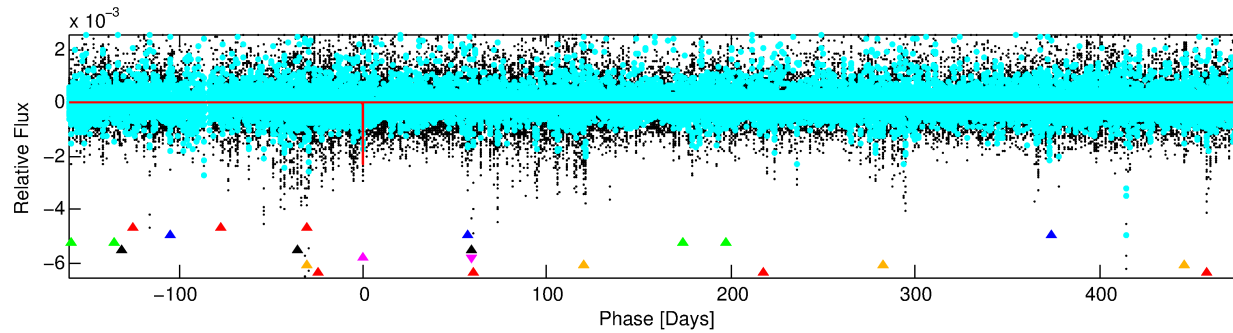
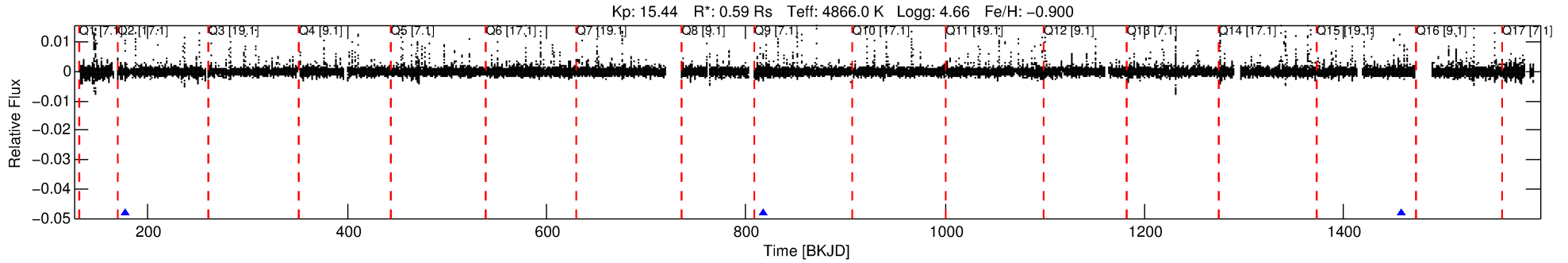
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009450669-05

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 5 of 7 Period: 639.971 d



## DV Fit Results:

Period = 639.97075 [0.00909] d  
Epoch = 177.3240 [0.0116] BKJD  
Rp/R\* = 0.0448 [0.0380]  
a/R\* = 899.90 [2708.92]  
b = 0.57 [3.64]  
Seff = 0.12 [0.02]  
Teq = 150 [6] K  
Rp = 2.90 [2.47] Re  
a = 1.2185 [0.0829] AU  
Ag = N/A  
Teffp = N/A

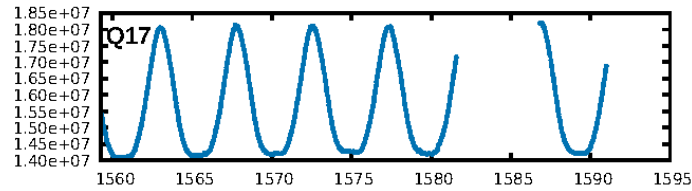
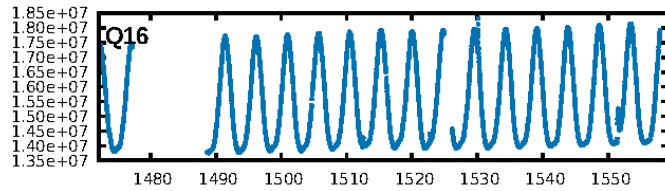
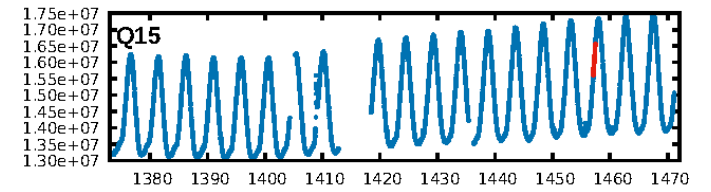
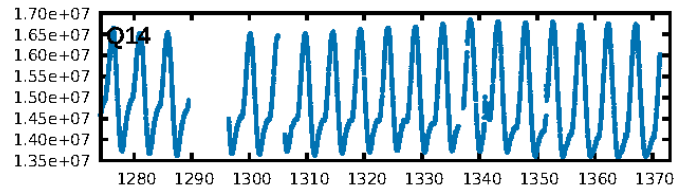
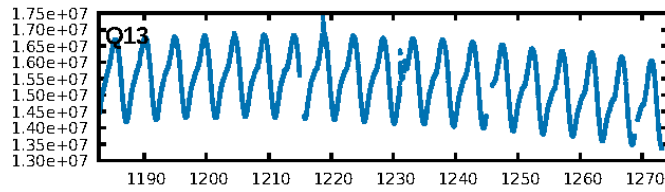
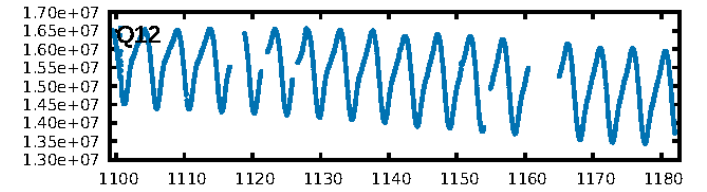
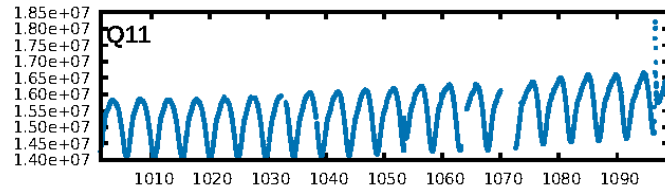
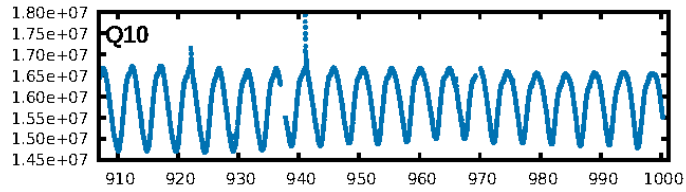
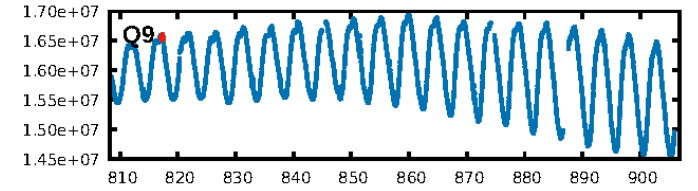
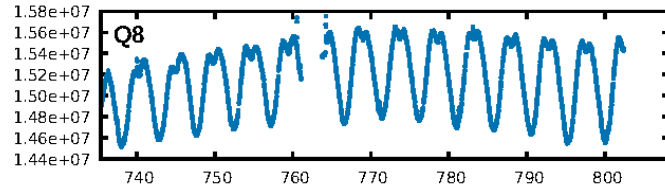
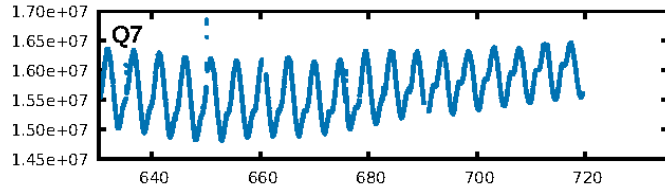
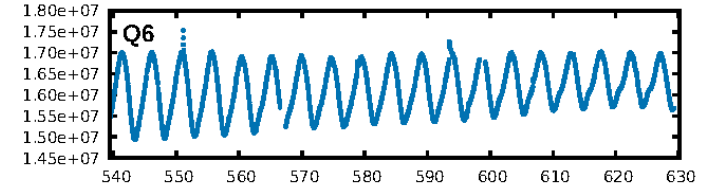
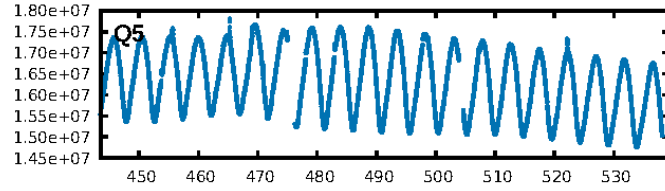
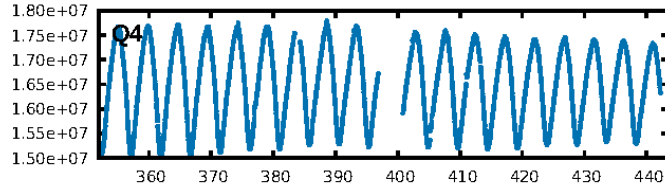
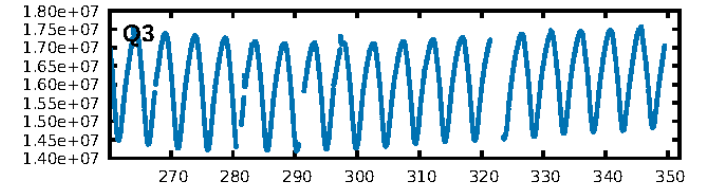
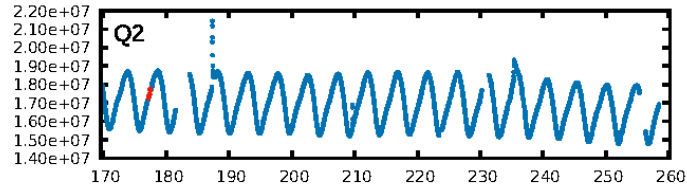
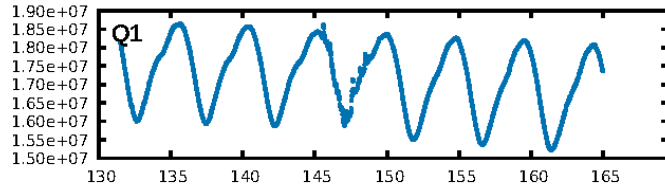
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [156.44σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 8.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.046  
Centroid-sig: 6.3%  
Centroid-so: 0.939 arcsec [1.31σ]  
OotOffset-rm: 0.139 arcsec [0.35σ]  
KicOffset-rm: 0.058 arcsec [0.18σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:45:24 Z

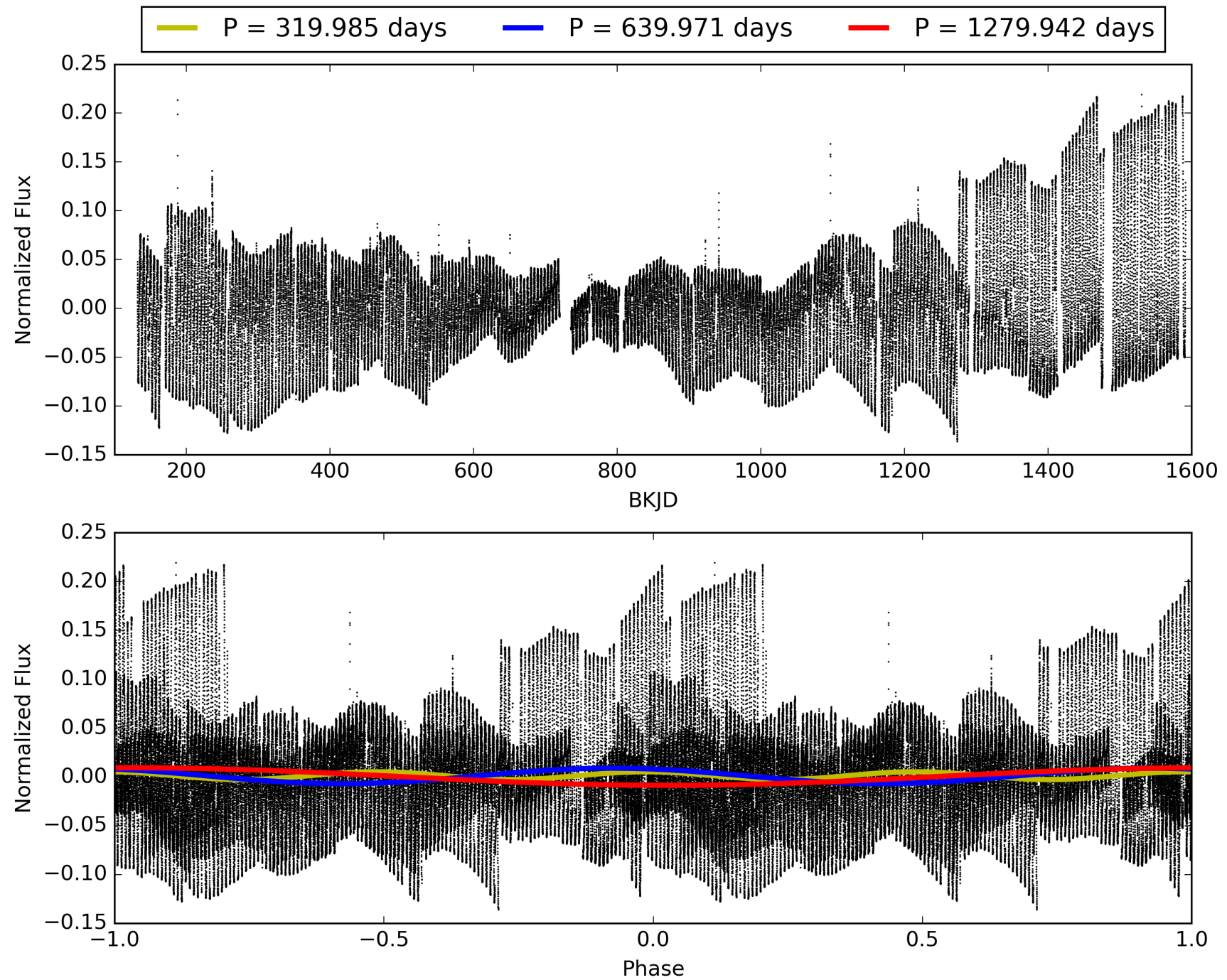
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009450669-05, PDC Light Curves



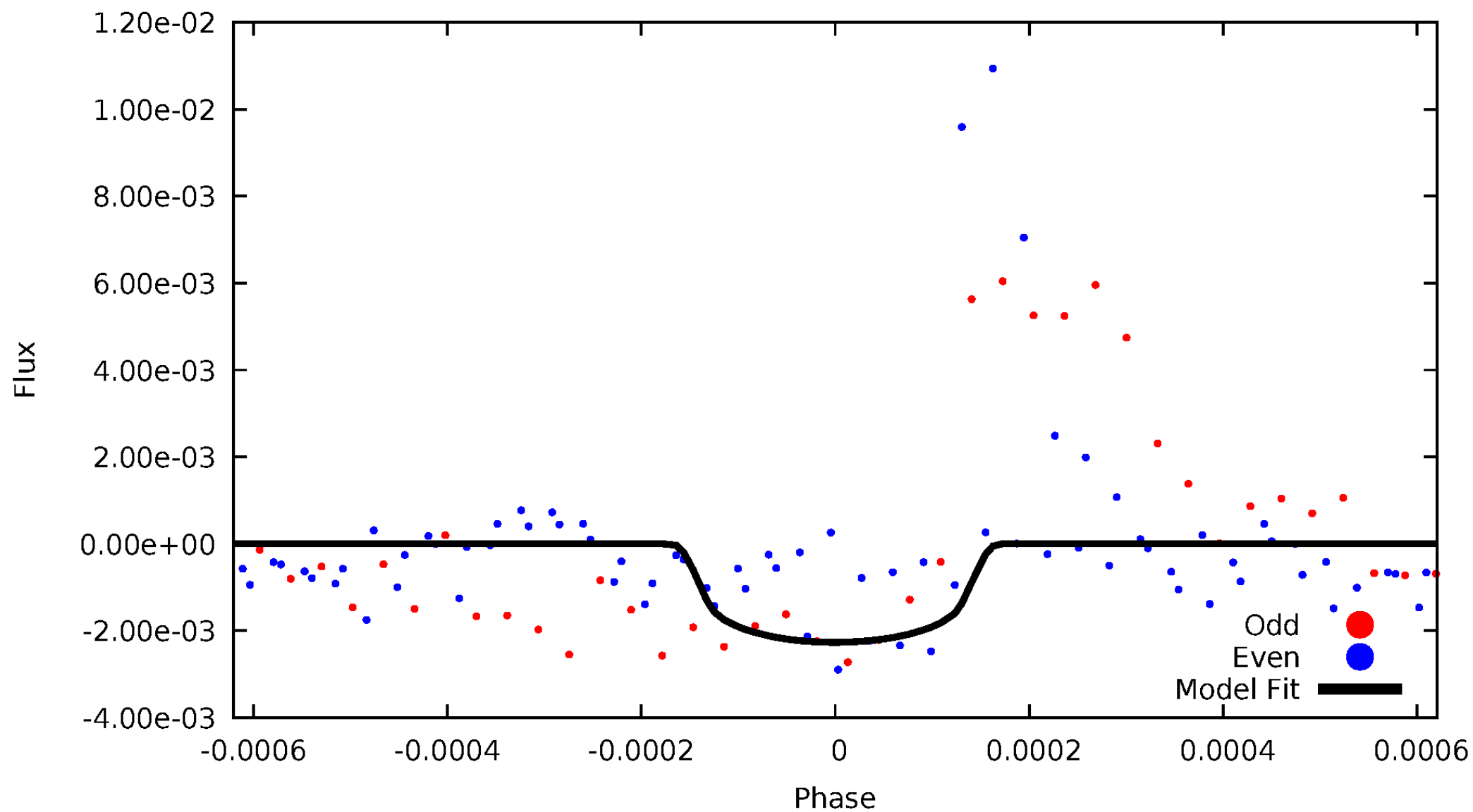


TCE 009450669-05



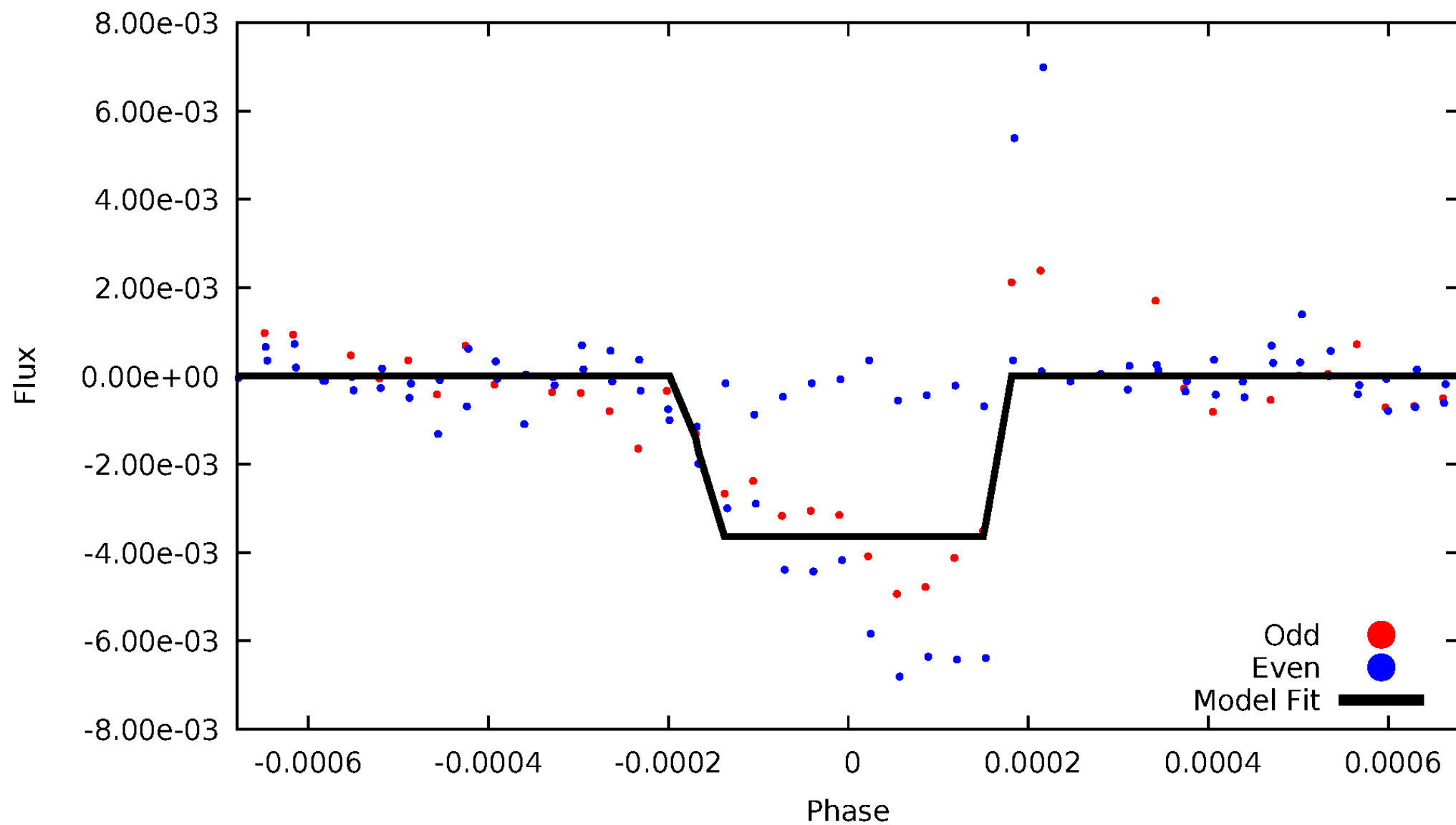
# DV Odd/Even

TCE 009450669-05



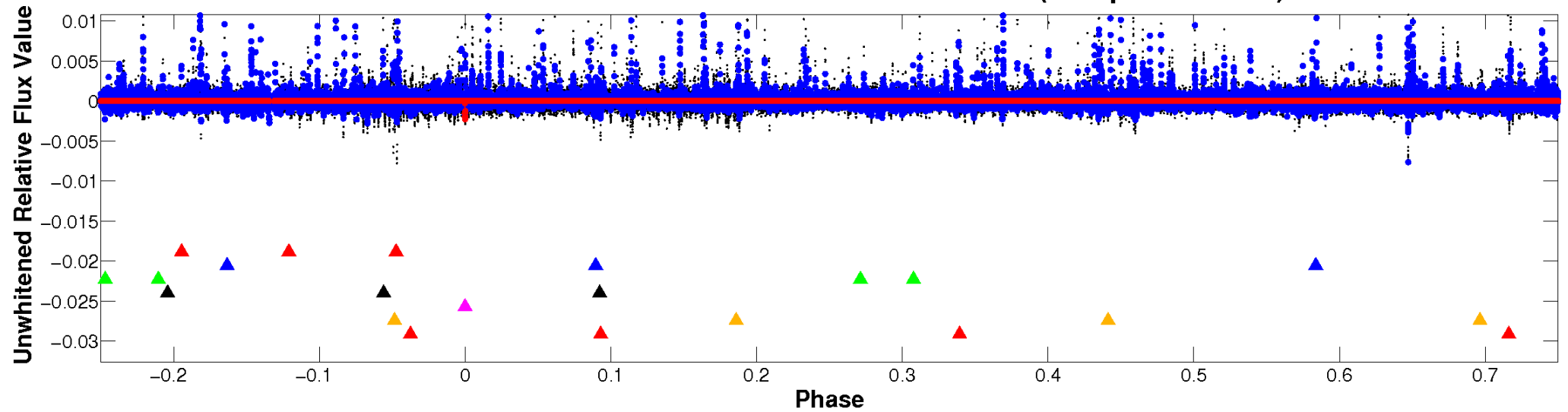
# ALT Odd/Even

TCE 009450669-05

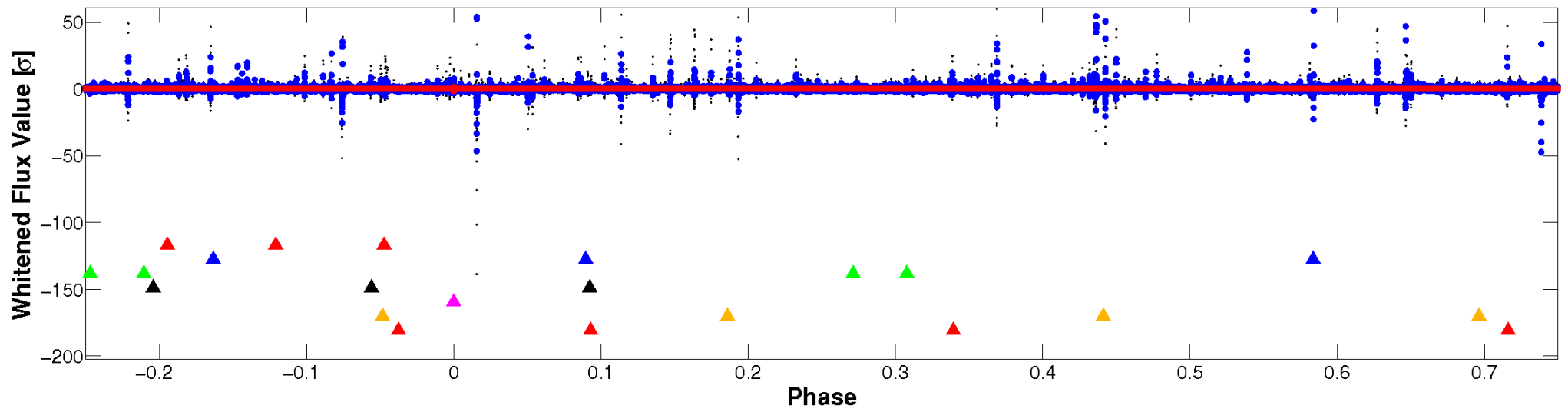


# Non-Whitened Vs. Whitened Light Curve

**Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

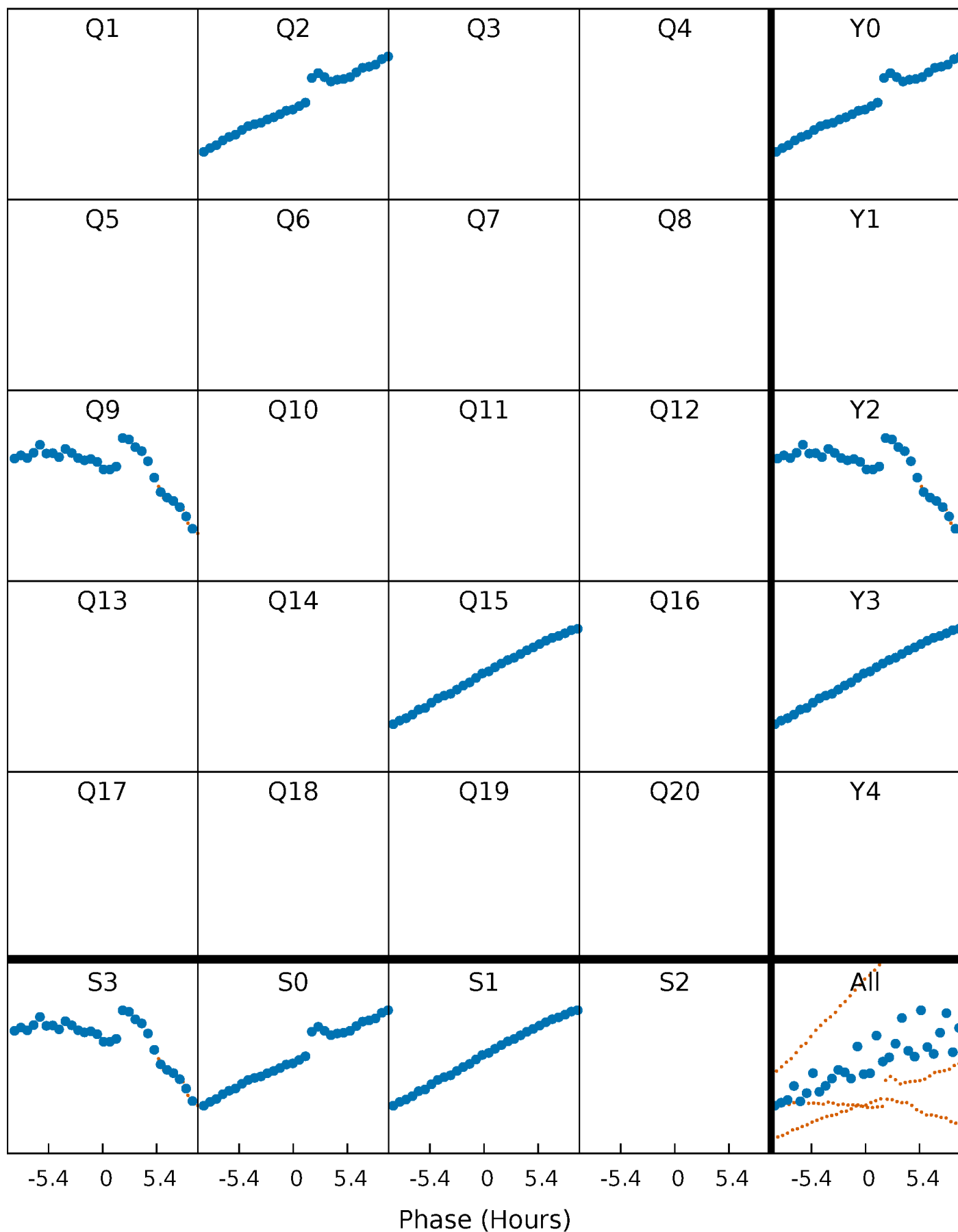


**Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



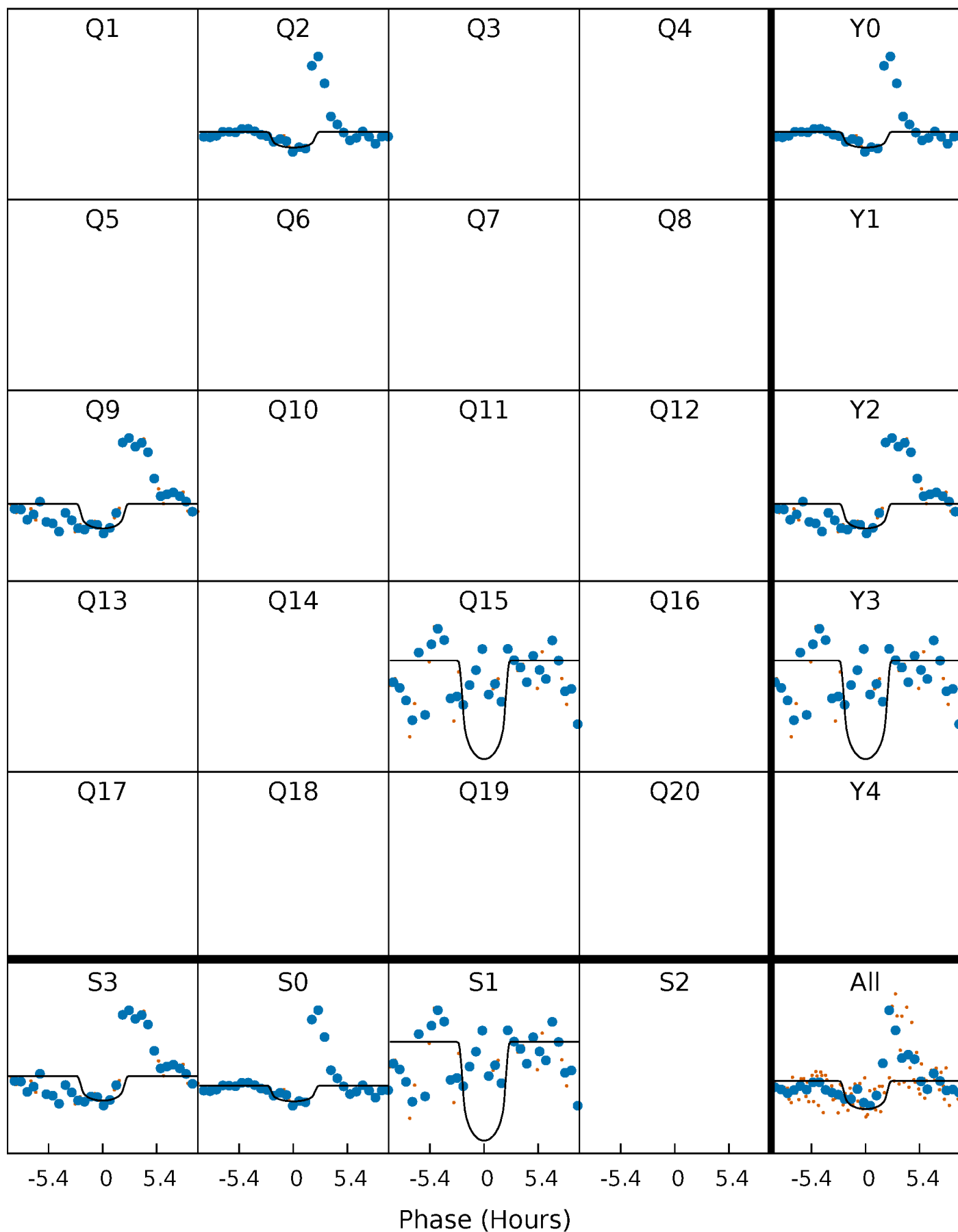
# PDC Quarter-Phased Transit Curves

TCE 009450669-05 P=639.970753 Days  $T_0=177.323963$  (BKJD)



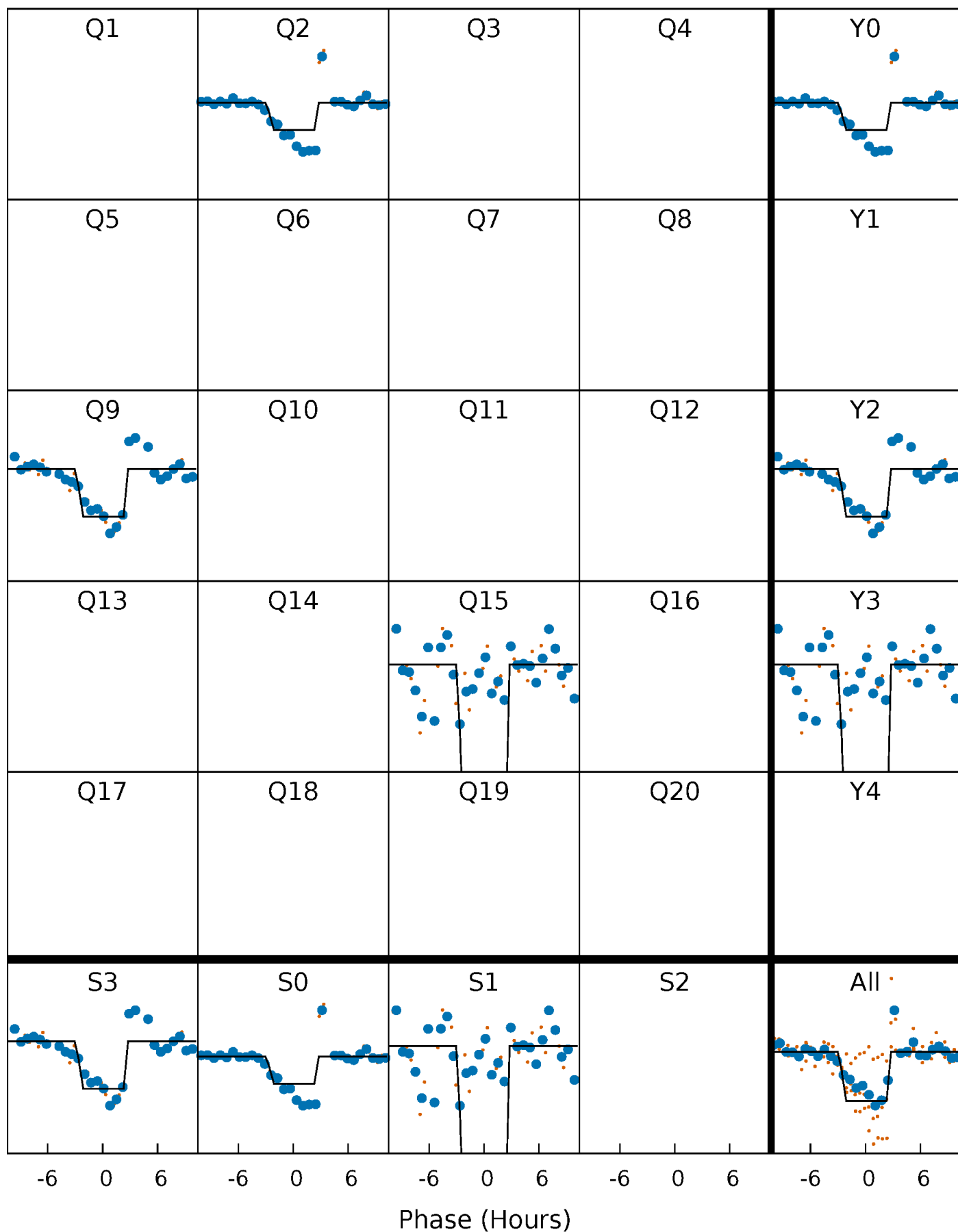
# DV Quarter-Phased Transit Curves

TCE 009450669-05     $P=639.970753$  Days     $T_0=177.323963$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

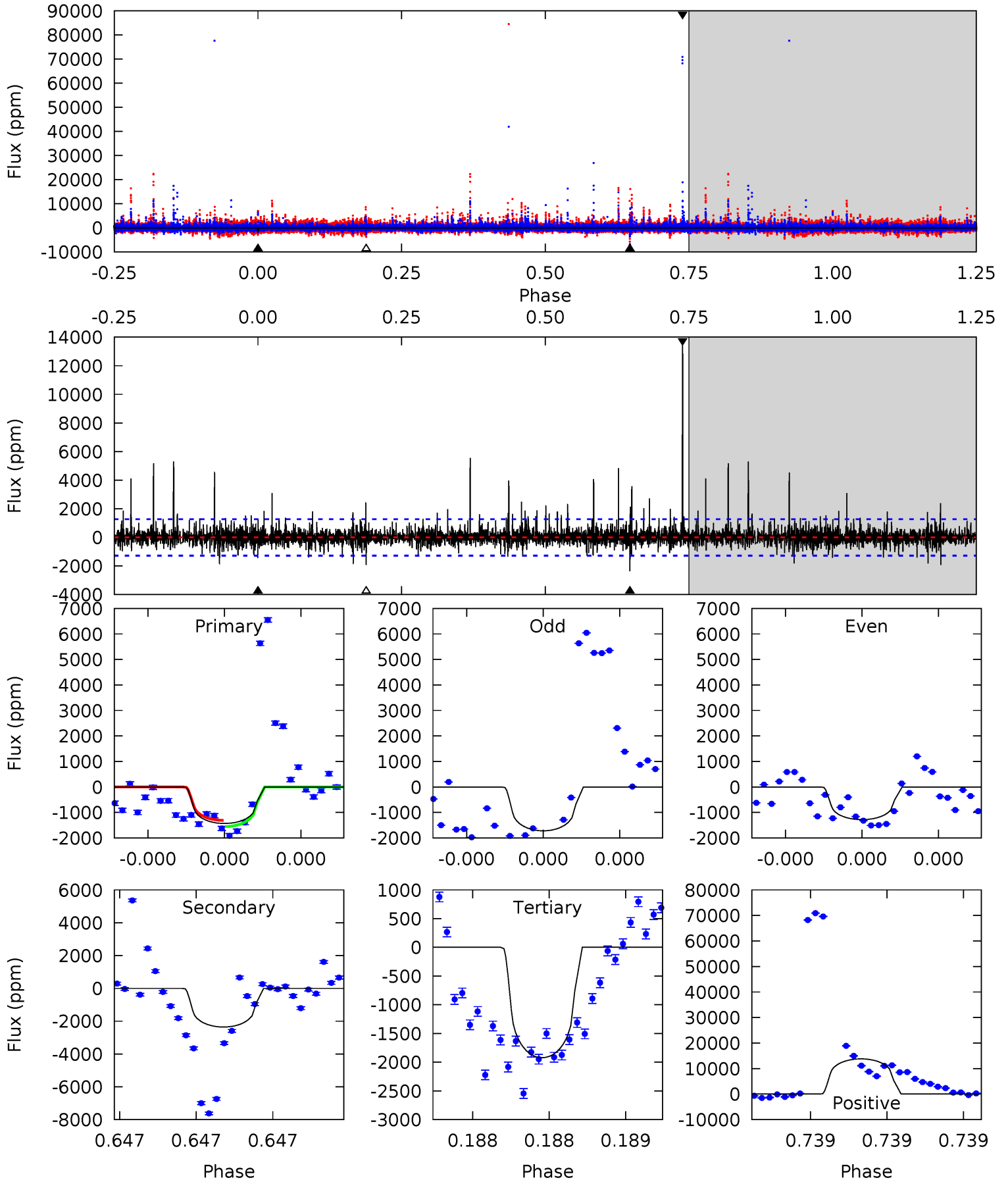
TCE 009450669-05     $P=639.979099$  Days     $T_0=177.289488$  (BKJD)



# DV Model-Shift Uniqueness Test

009450669-05, P = 639.970753 Days, E = 177.323963 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.35	10.4	8.52	61.2	5.65	3.59	2.32	-2.18	-54.9	1.92	-50.8	0.46	1.00	0.85	0.54

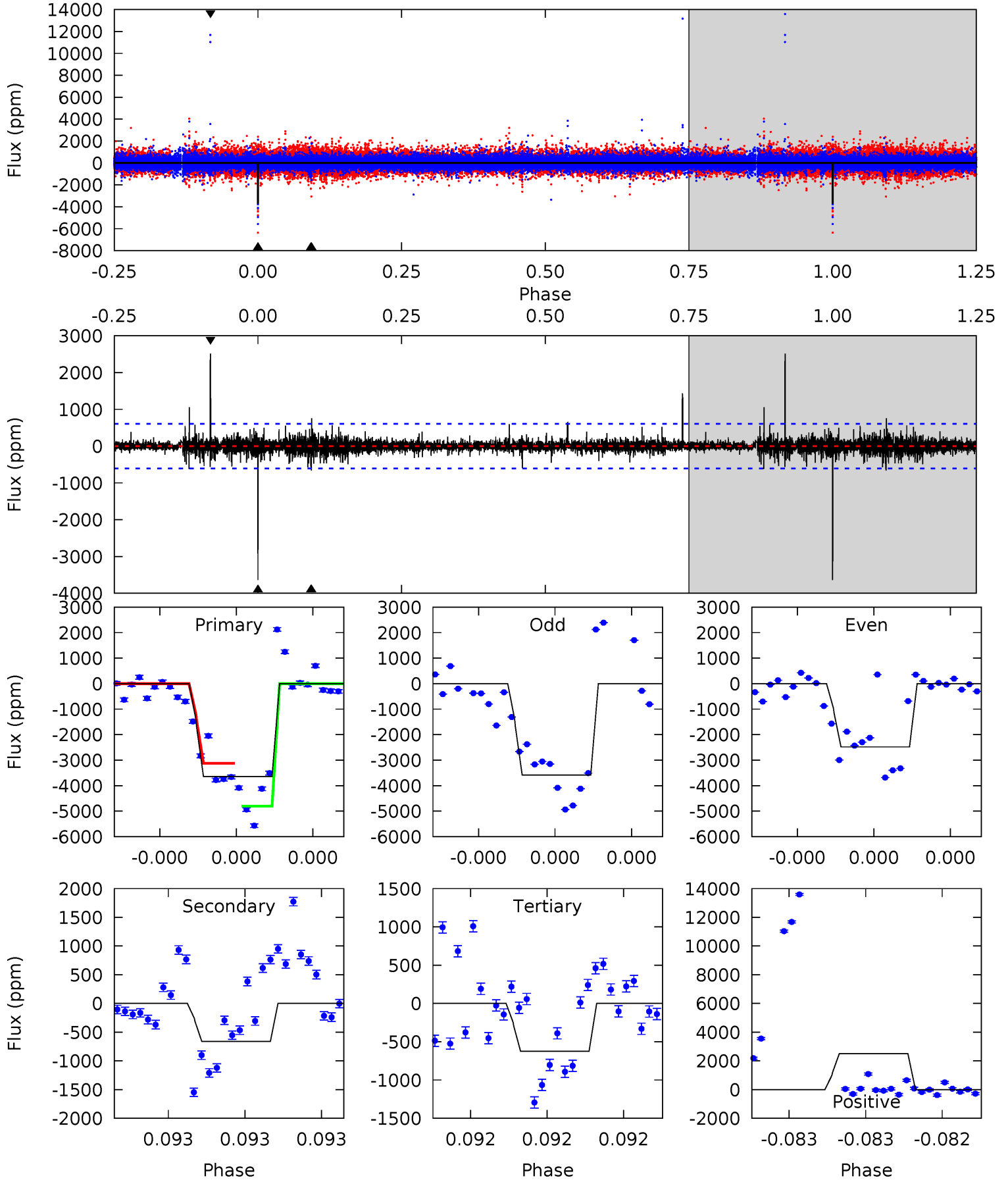




# Alt Model-Shift Uniqueness Test

009450669-05, P = 639.979099 Days, E = 177.289488 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.9	6.17	5.80	23.4	5.65	3.60	1.00	28.1	10.5	0.37	-17.2	4.64	0.84	0.41	7.78



### Stellar Parameters For KIC 009450669

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2355 \pm 225$	$3.38^{+2.27}_{-2.07}$	$209^{+7}_{-8}$	$4757^{+2623}_{-867}$	$173441^{+964851}_{-113166}$
Alt.	$-663 \pm 107$	$4.05^{+2.47}_{-2.17}$	$209^{+7}_{-8}$	$3542^{+1152}_{-491}$	$33319^{+121652}_{-20449}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

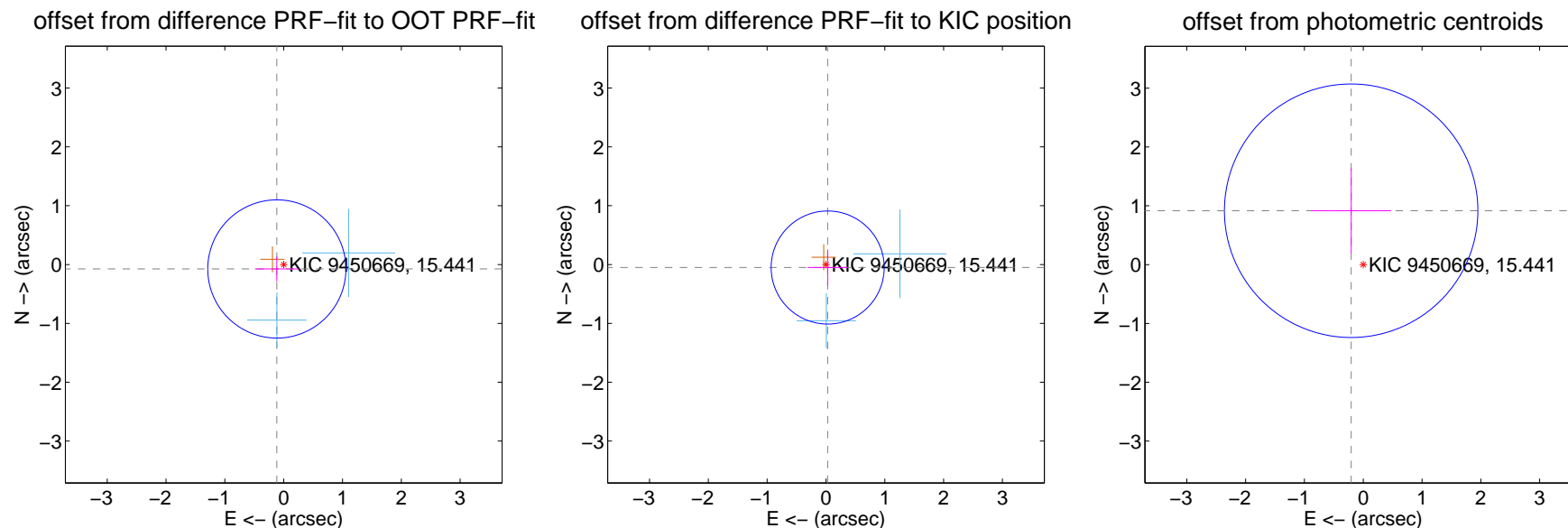
## DV Centroid Data

Supplemental centroid analysis for 009450669-05. Kepler magnitude: 15.44. Transit SNR 7.64

There are 2 quarters with good PRF difference image offsets

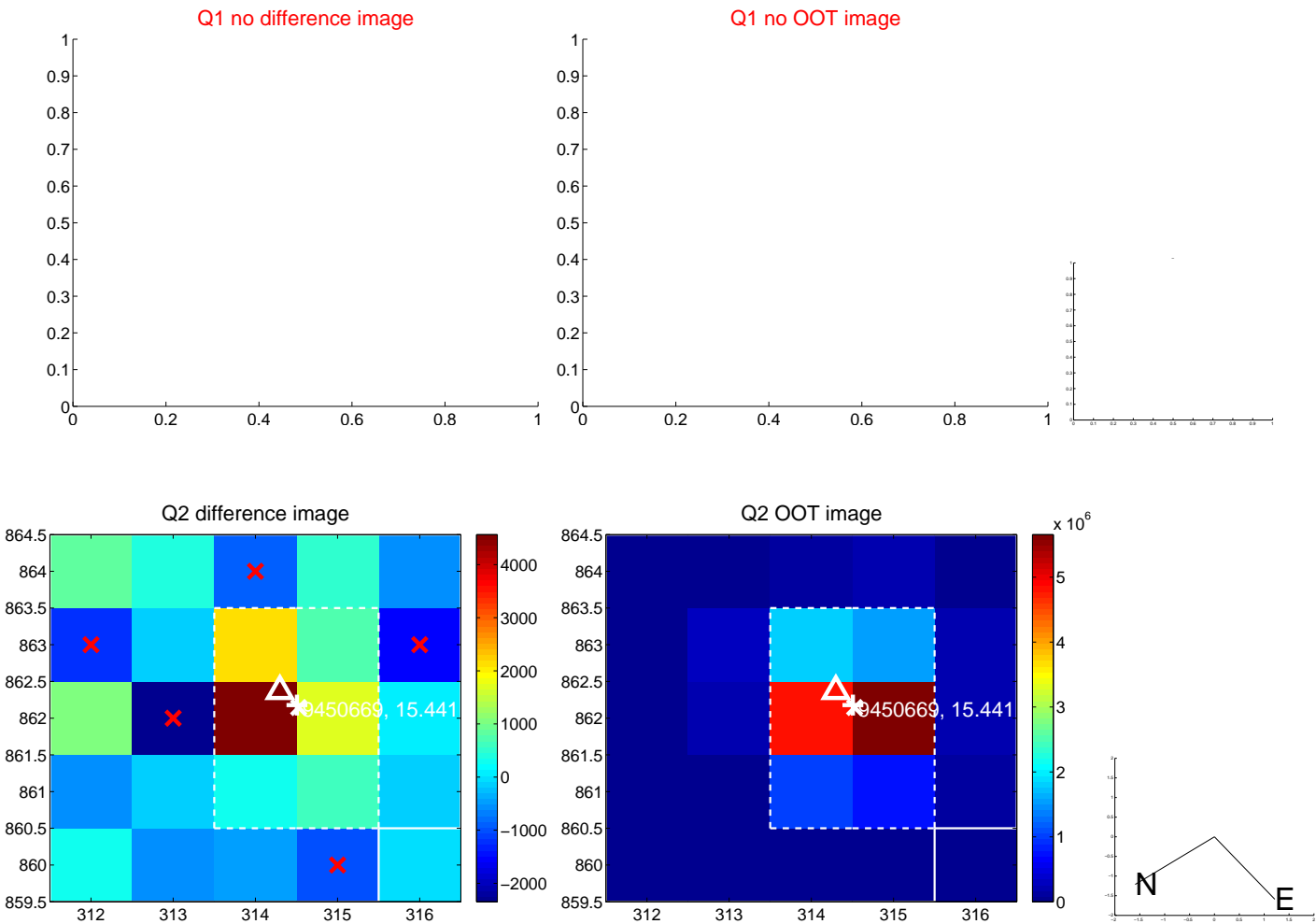
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.139 \pm 0.391$	0.35	$0.117 \pm 0.372$	$-0.075 \pm 0.211$
PRF-fit source offset from KIC position	$0.058 \pm 0.320$	0.18	$-0.029 \pm 0.345$	$-0.051 \pm 0.307$
photometric centroid source offset	$0.94 \pm 0.72$	1.31	$0.21 \pm 0.68$	$0.92 \pm 0.72$

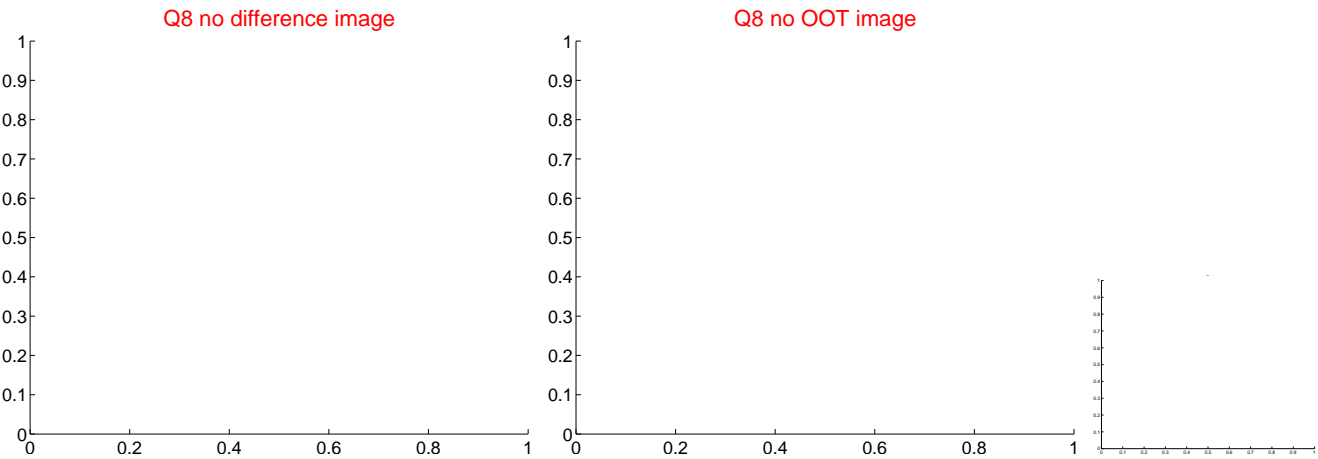
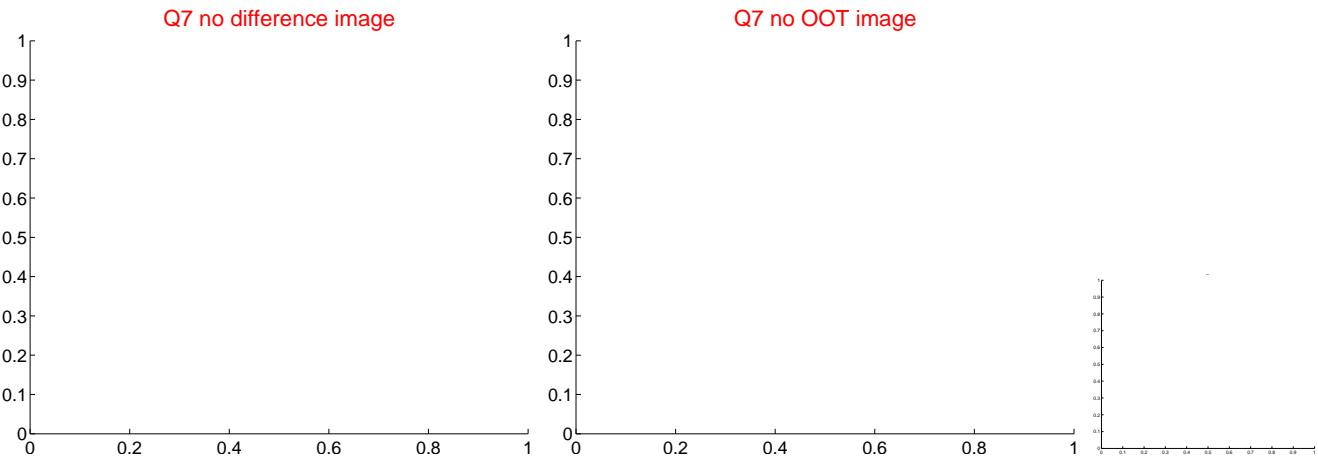
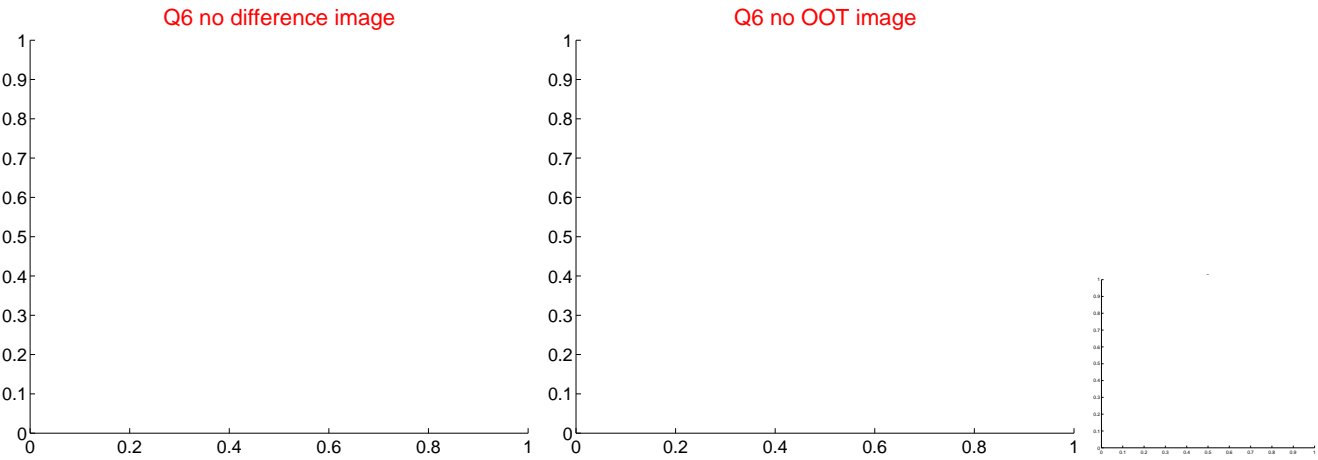
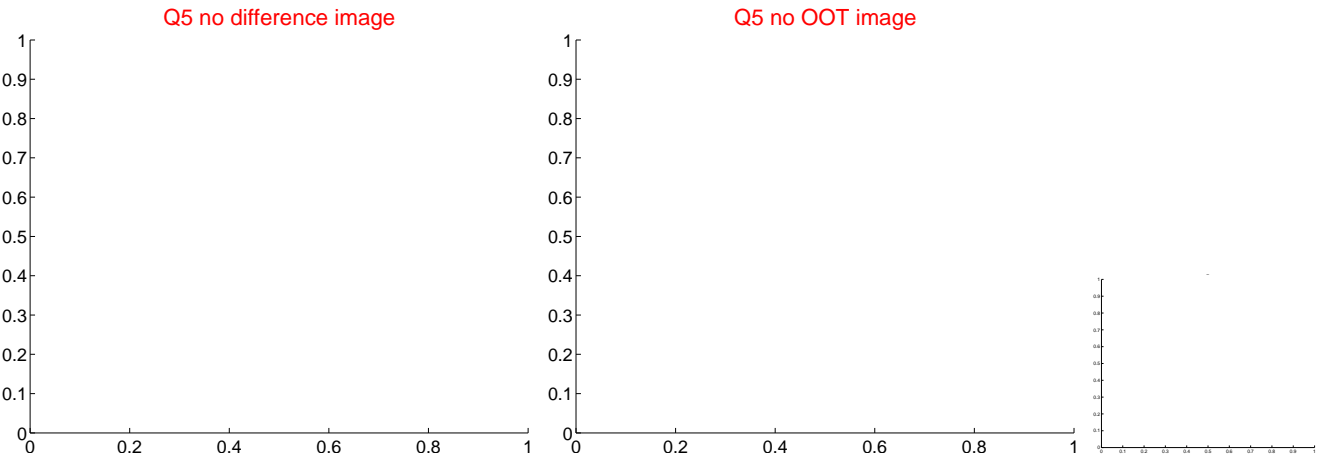


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

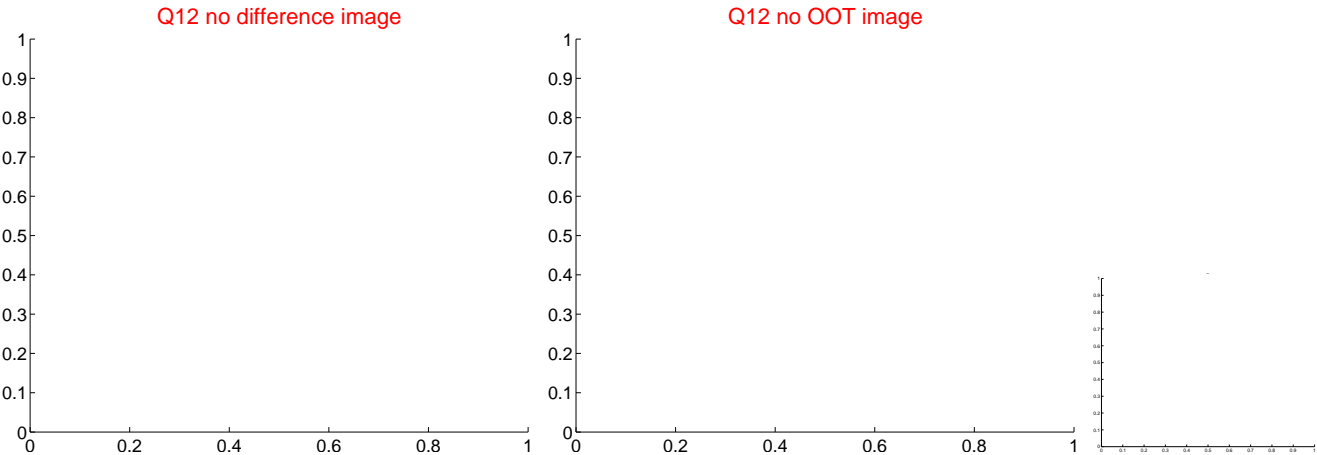
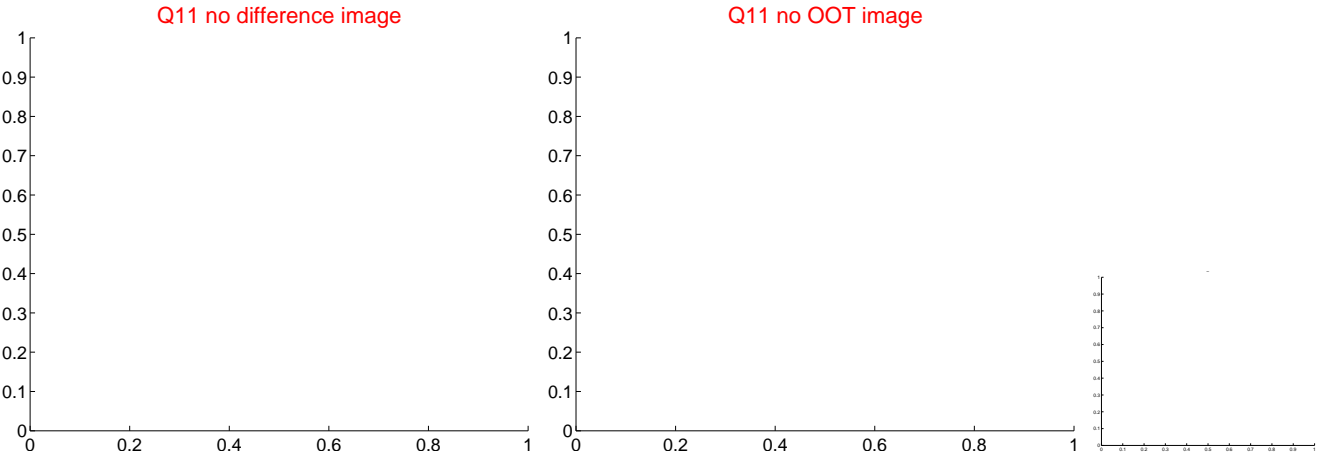
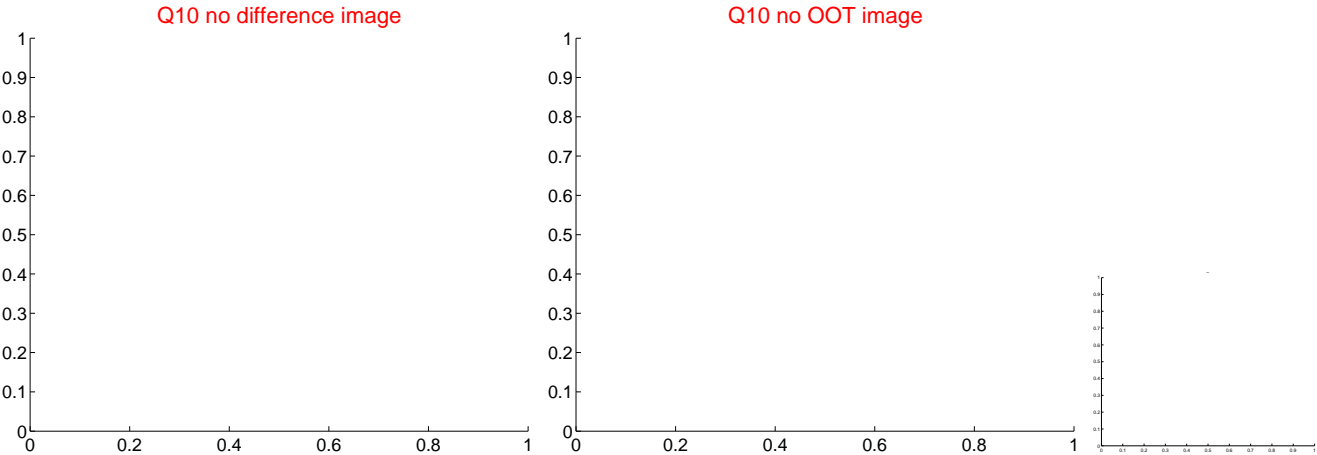
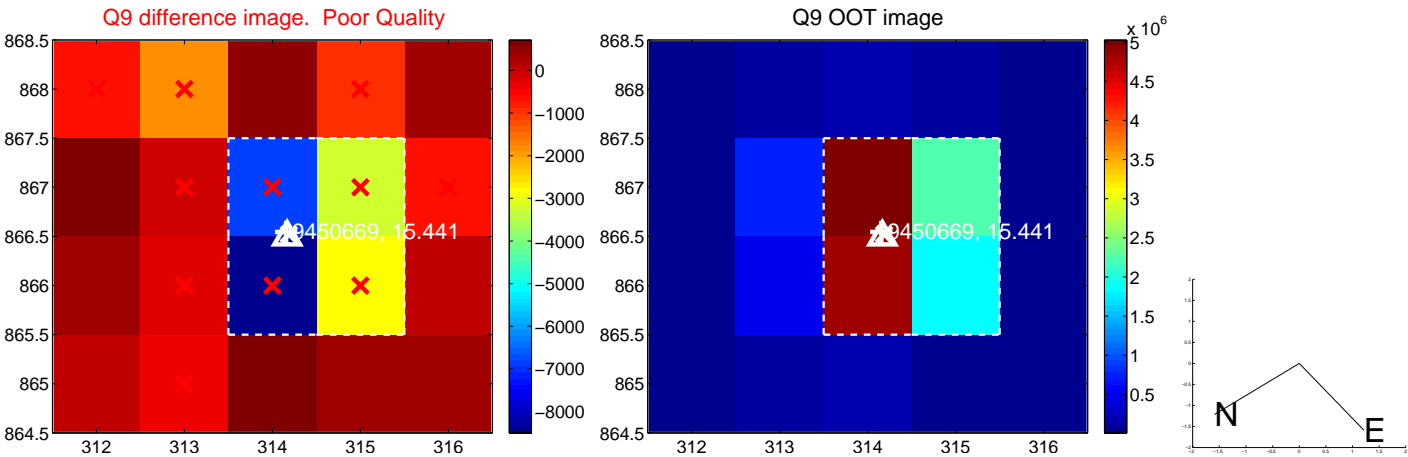
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



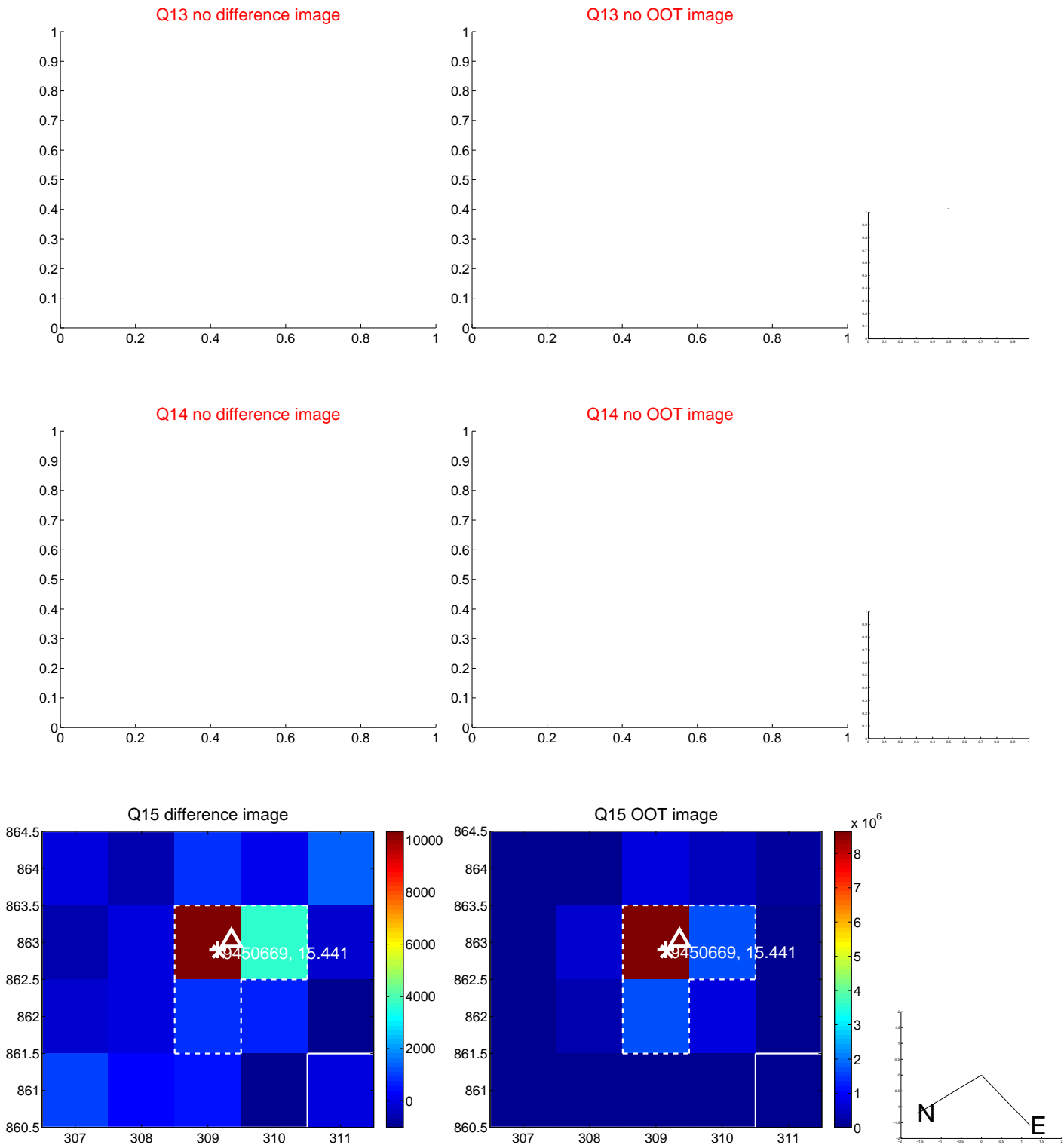
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



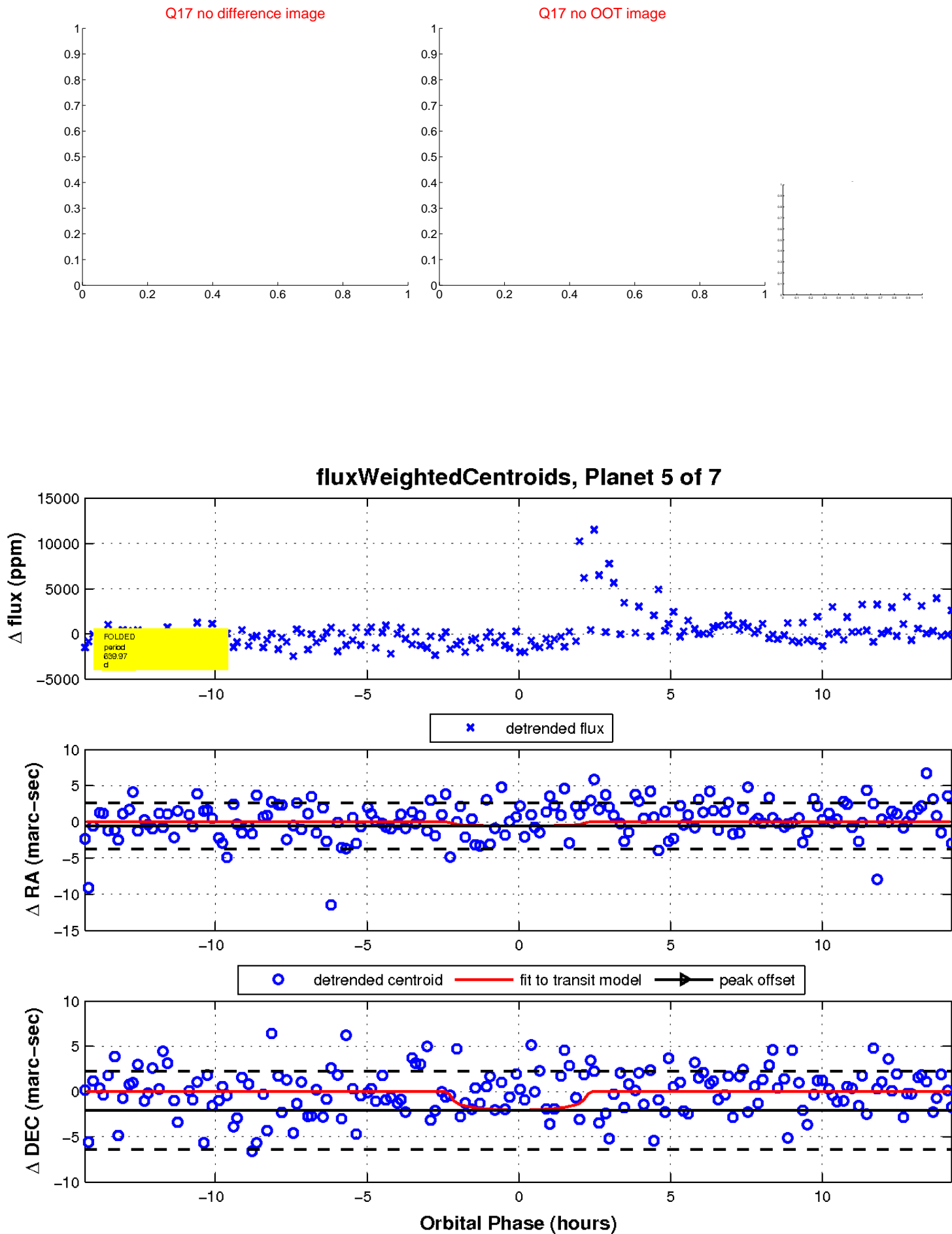
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



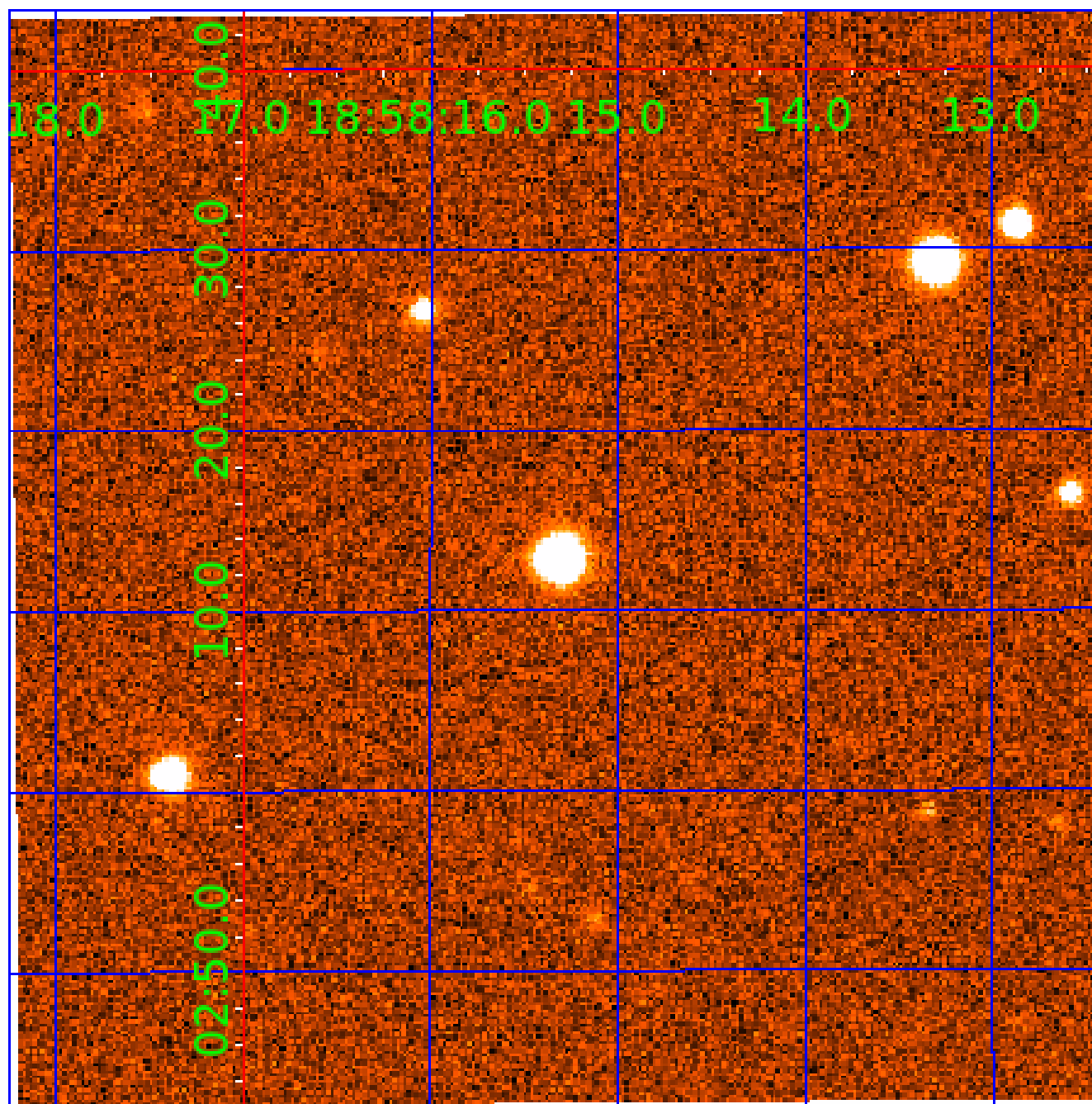
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
009450669-02	OBS	No	478.087940	234.703569	3454.2	12.306	17.3	9.5	0.59	4866	3.94	0.17
009450669-03	OBS	No	308.327828	374.263208	2327.8	5.229	18.0	9.1	0.59	4866	4.63	0.32
009450669-04	OBS	No	545.110344	236.416352	3176.8	4.963	17.3	11.3	0.59	4866	3.68	0.15
009450669-05	OBS	No	639.970752	177.323963	2264.6	4.765	16.7	7.6	0.59	4866	2.90	0.12
009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009450669-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

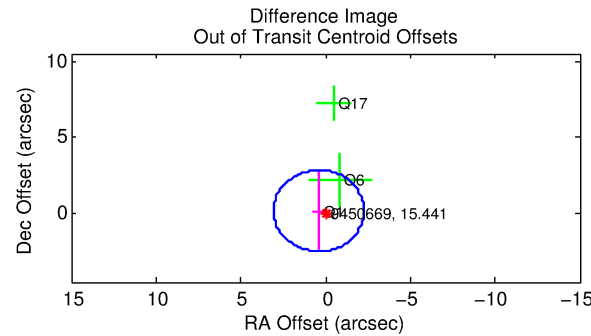
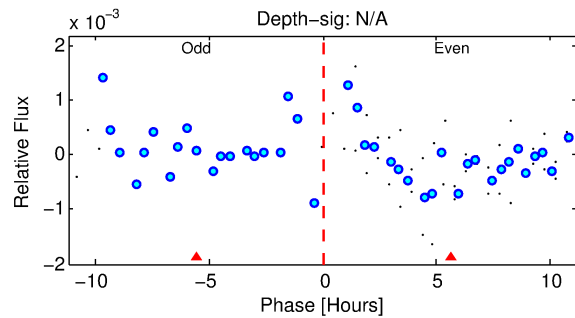
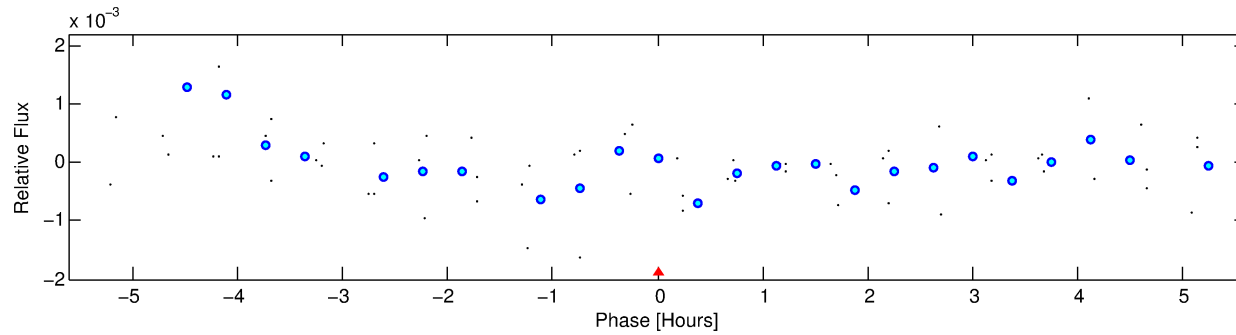
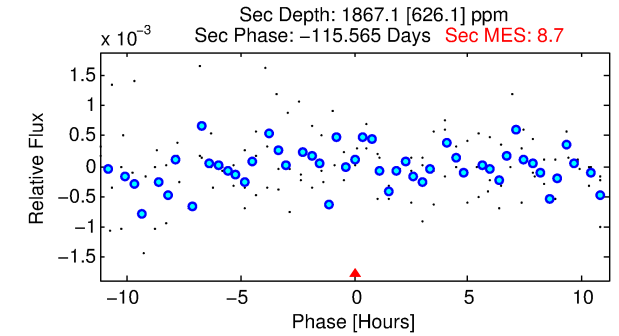
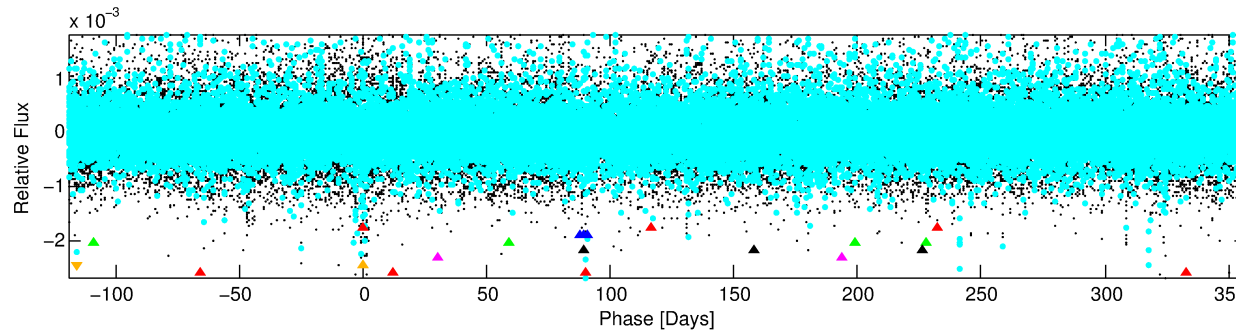
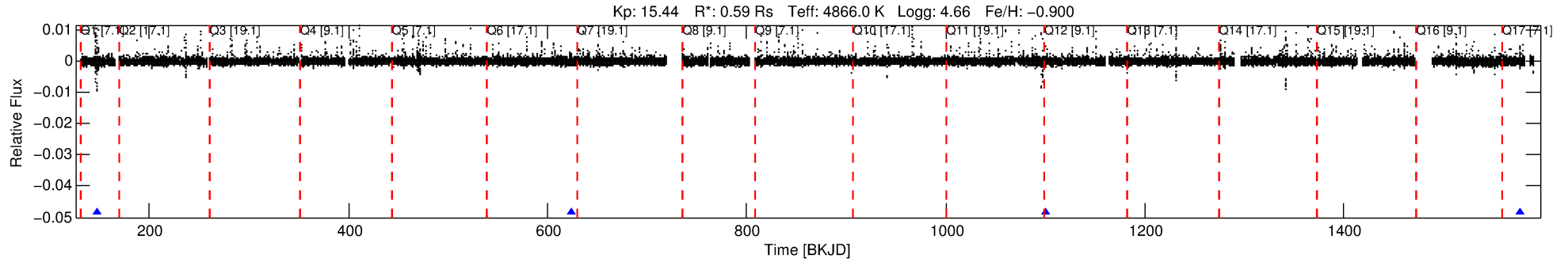
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009450669-06

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 6 of 7 Period: 476.654 d



## TPS TCE Results:

Period = 476.65365 d  
Epoch = 146.3594 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

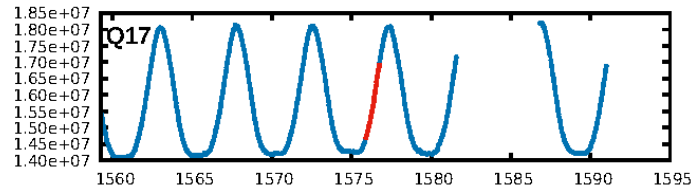
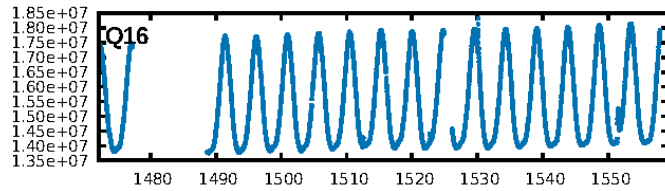
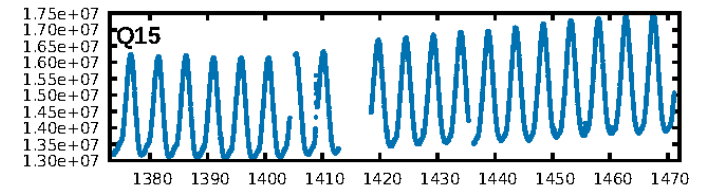
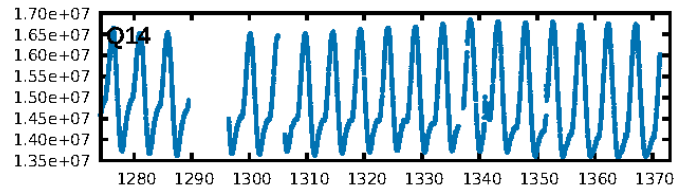
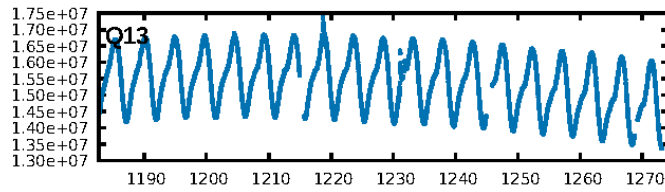
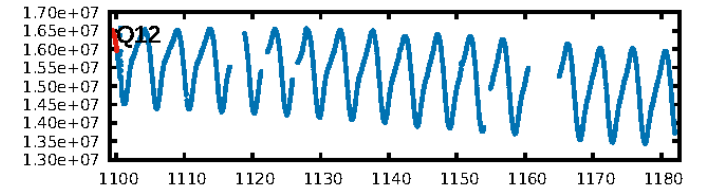
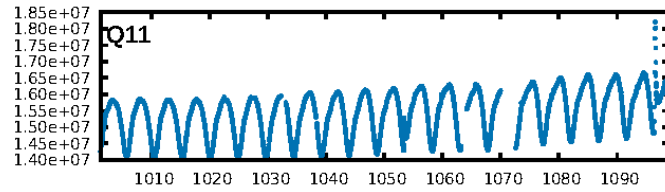
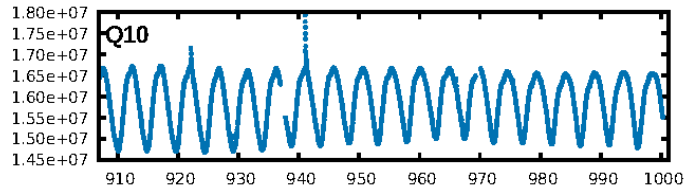
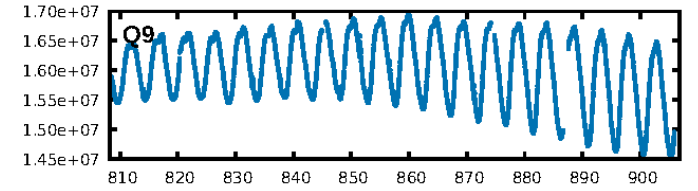
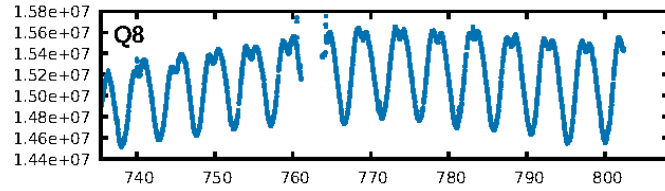
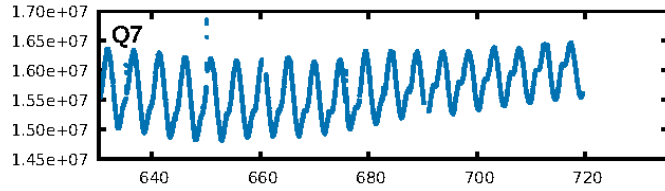
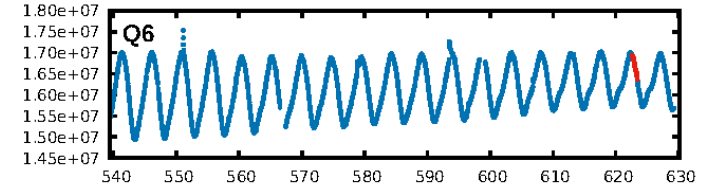
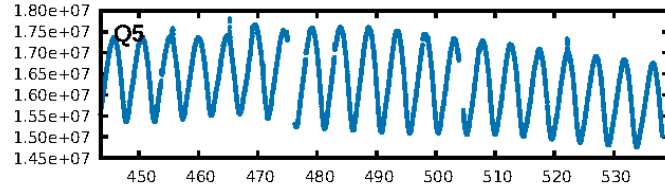
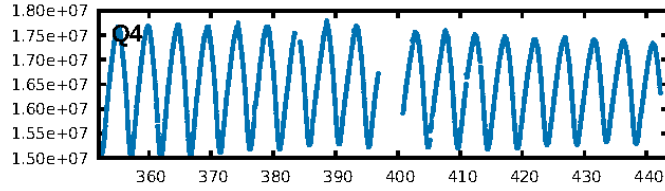
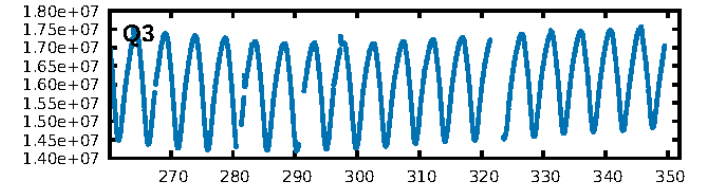
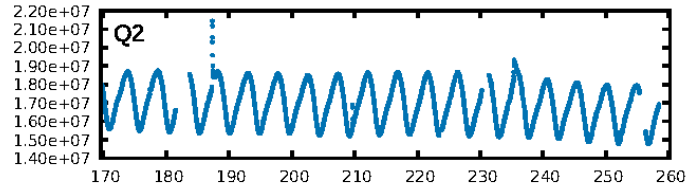
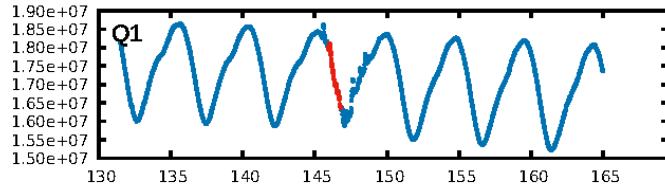
ShortPeriod-sig: 100.0% [144.80 $\sigma$ ]  
LongPeriod-sig: 96.7% [2.13 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
**GhostDiagnostic-chr: -0.7664**

Centroid-sig: 3.0%  
Centroid-so: N/A  
OotOffset-rm: 0.433 arcsec [0.49 $\sigma$ ]  
KicOffset-rm: 0.404 arcsec [0.41 $\sigma$ ]  
OotOffset-st: 1/0/0/2 [3]  
KicOffset-st: 1/0/0/2 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 0.67 [2/3]

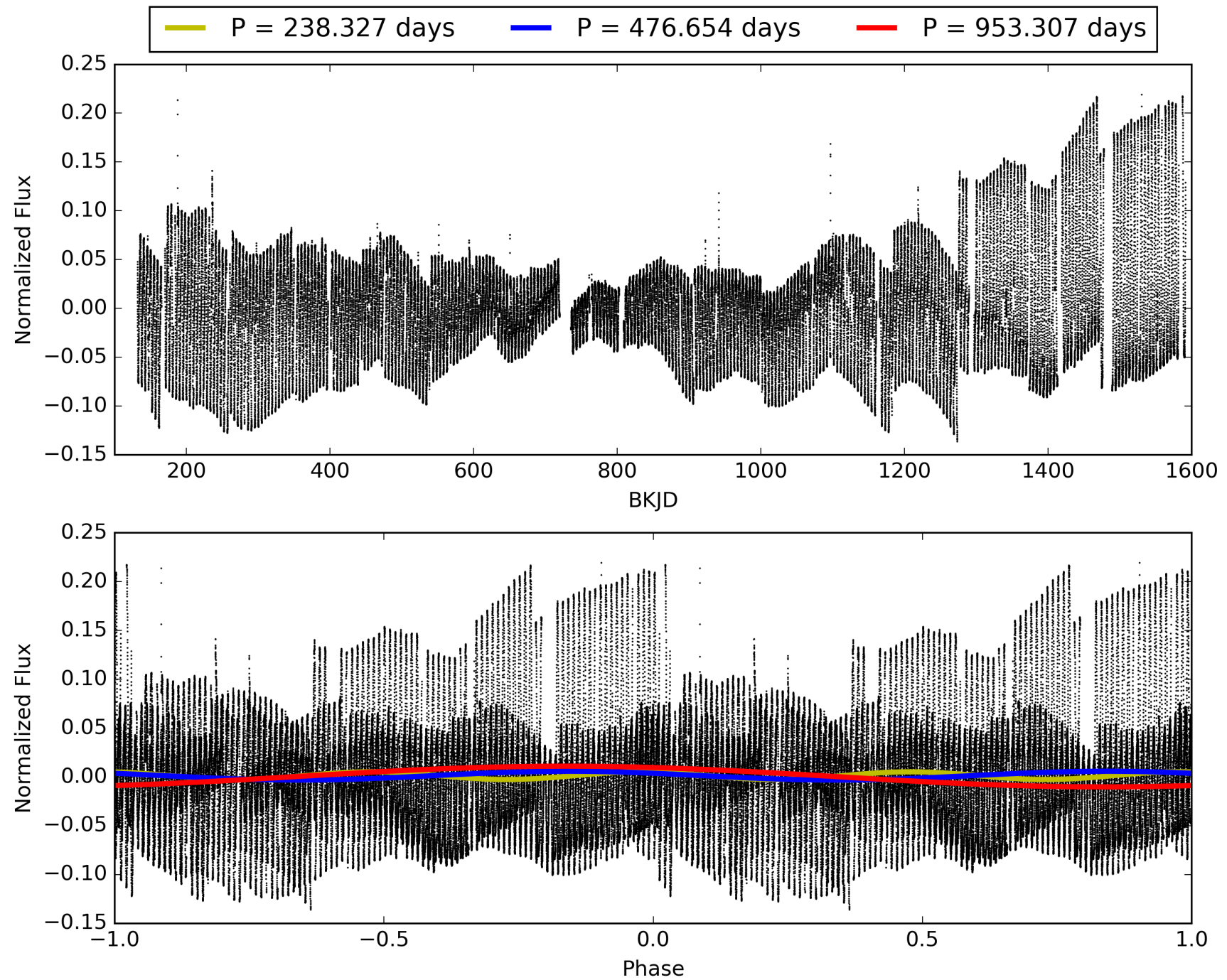
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:45:54 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009450669-06, PDC Light Curves

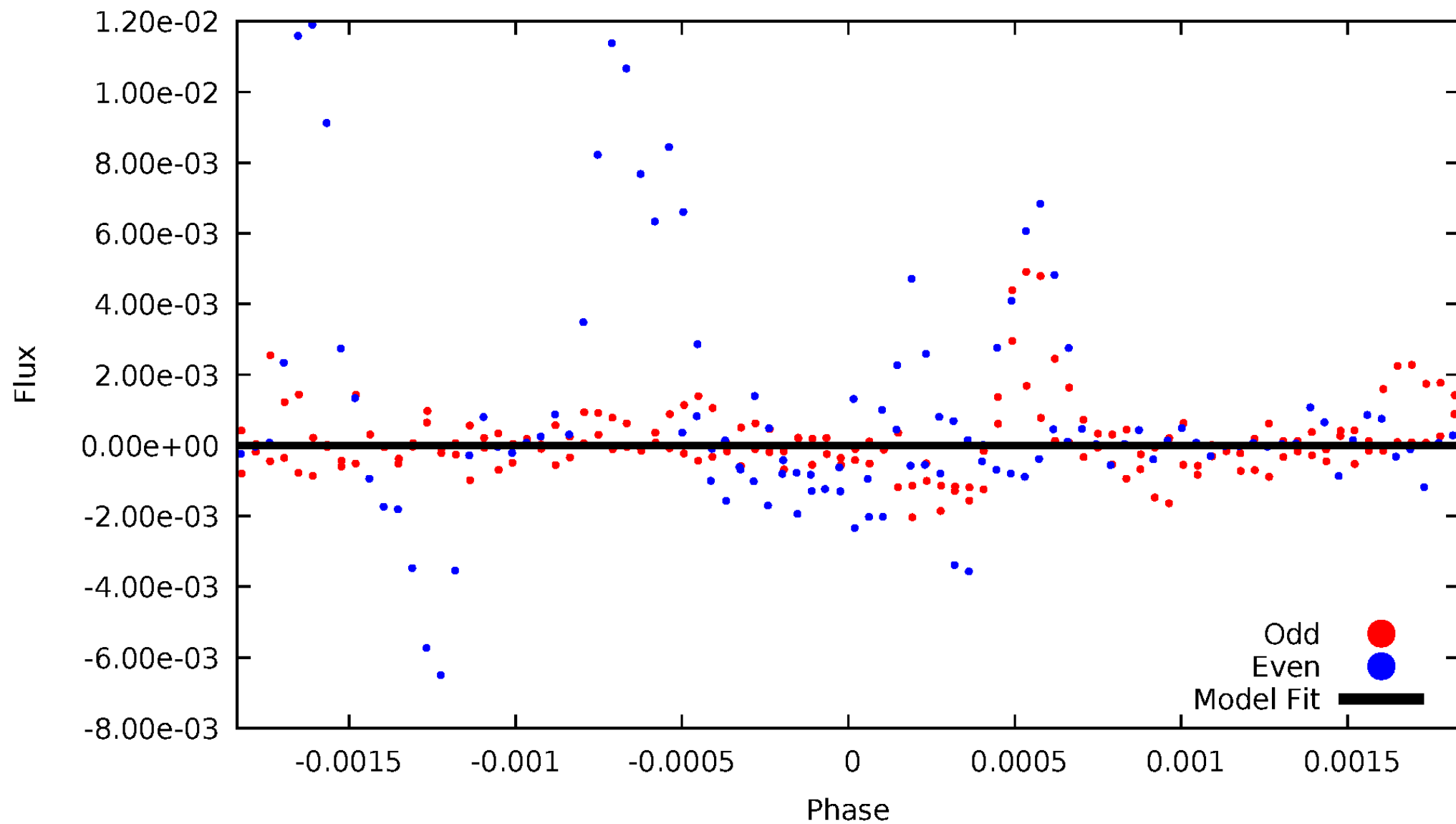


TCE 009450669-06



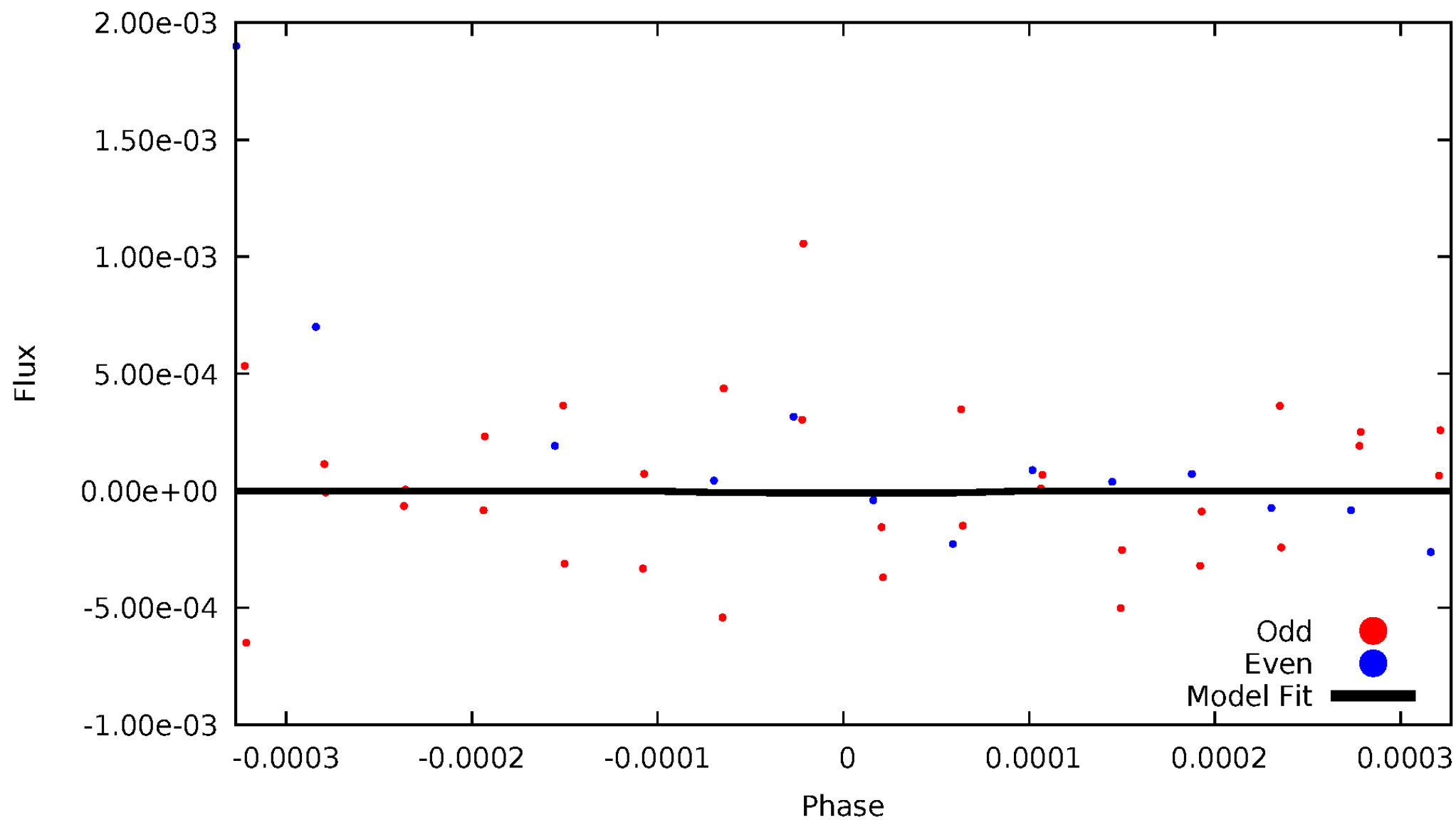
# DV Odd/Even

TCE 009450669-06



# ALT Odd/Even

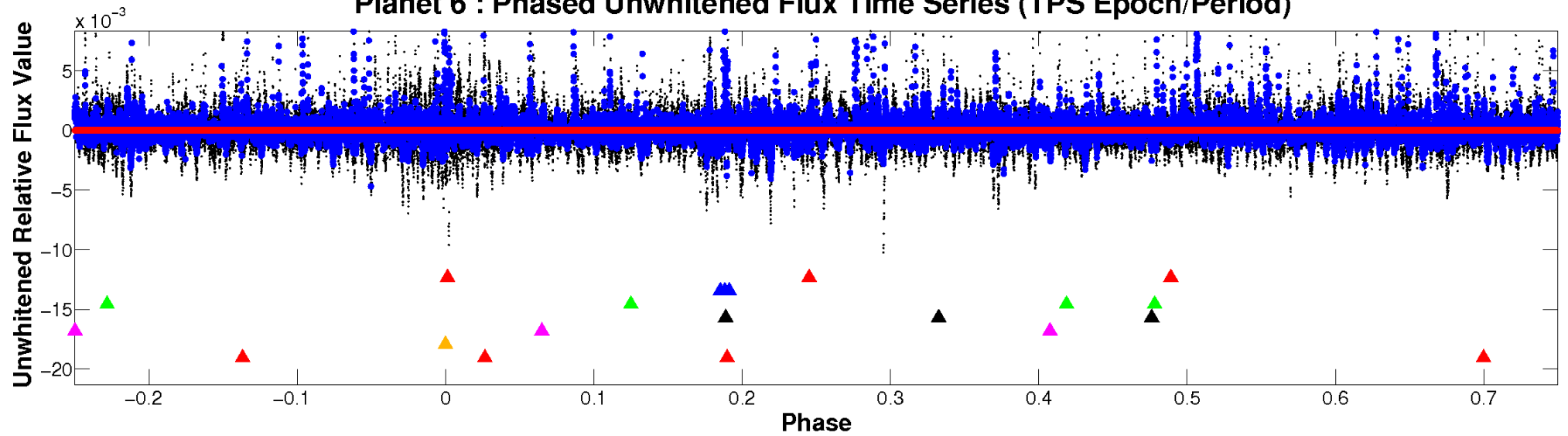
TCE 009450669-06



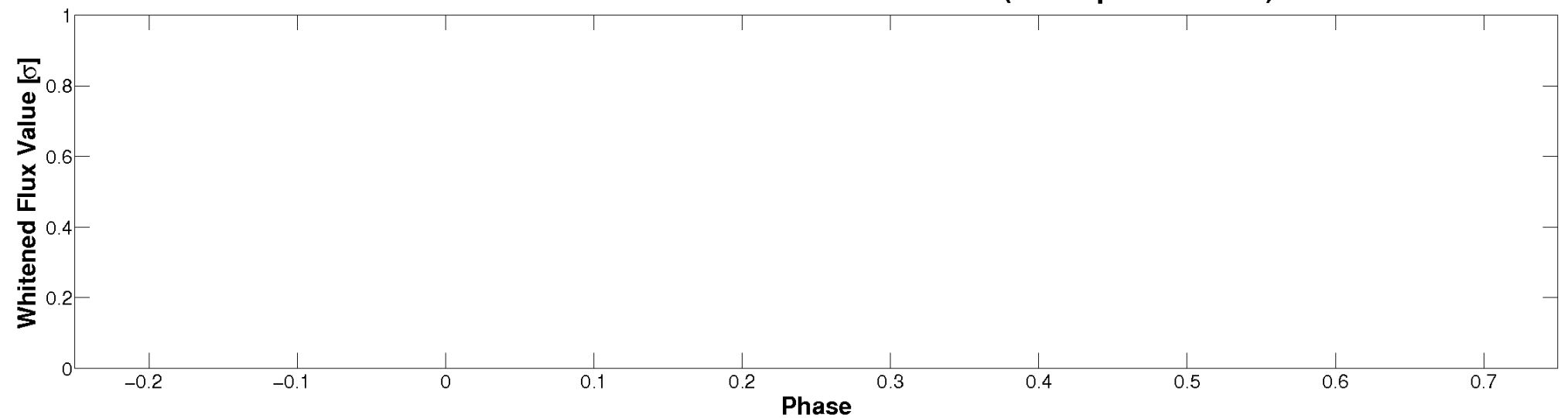


# Non-Whitened Vs. Whitened Light Curve

**Planet 6 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**



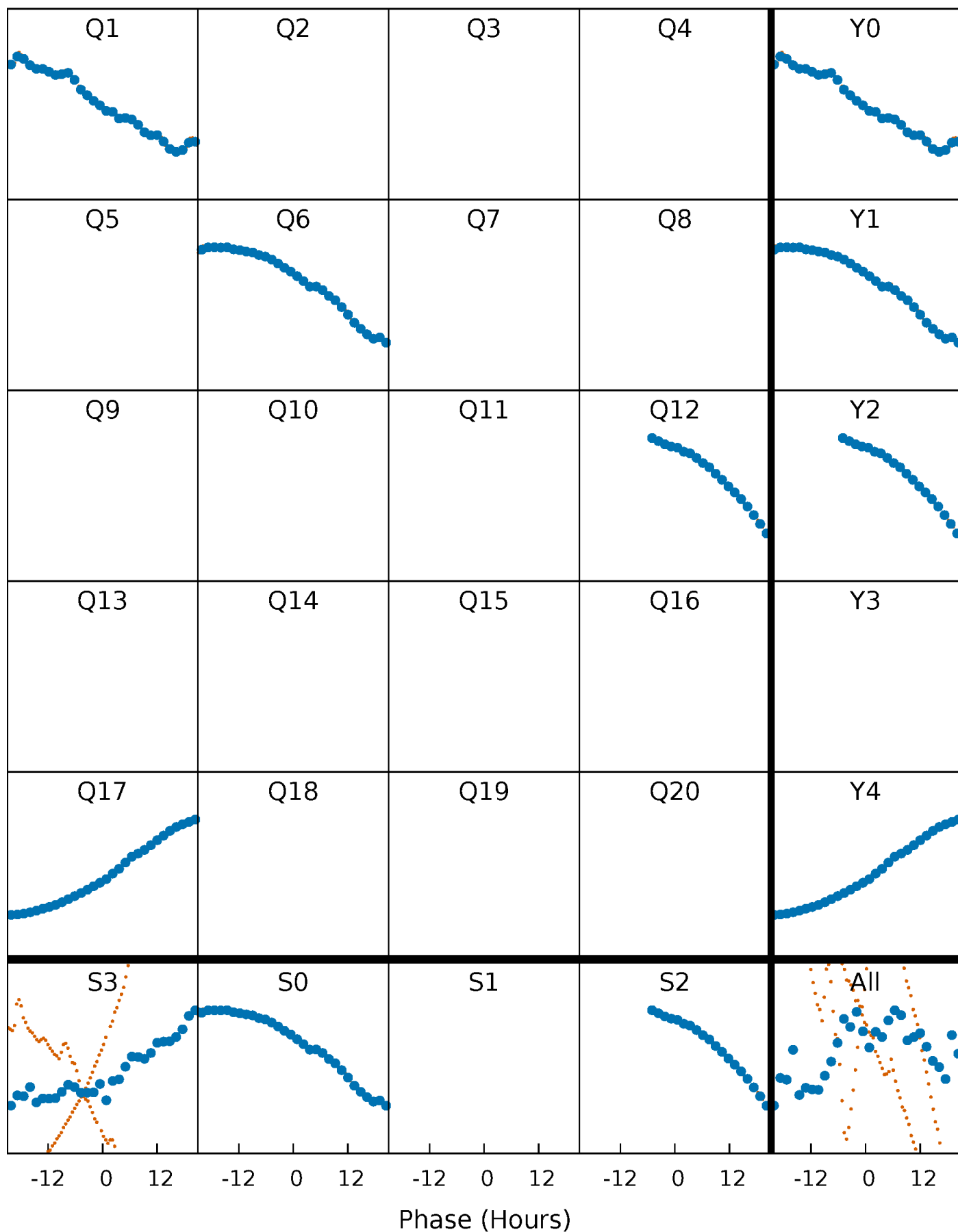
**Planet 6 : Phased Whitened Flux Time Series (TPS Epoch/Period)**





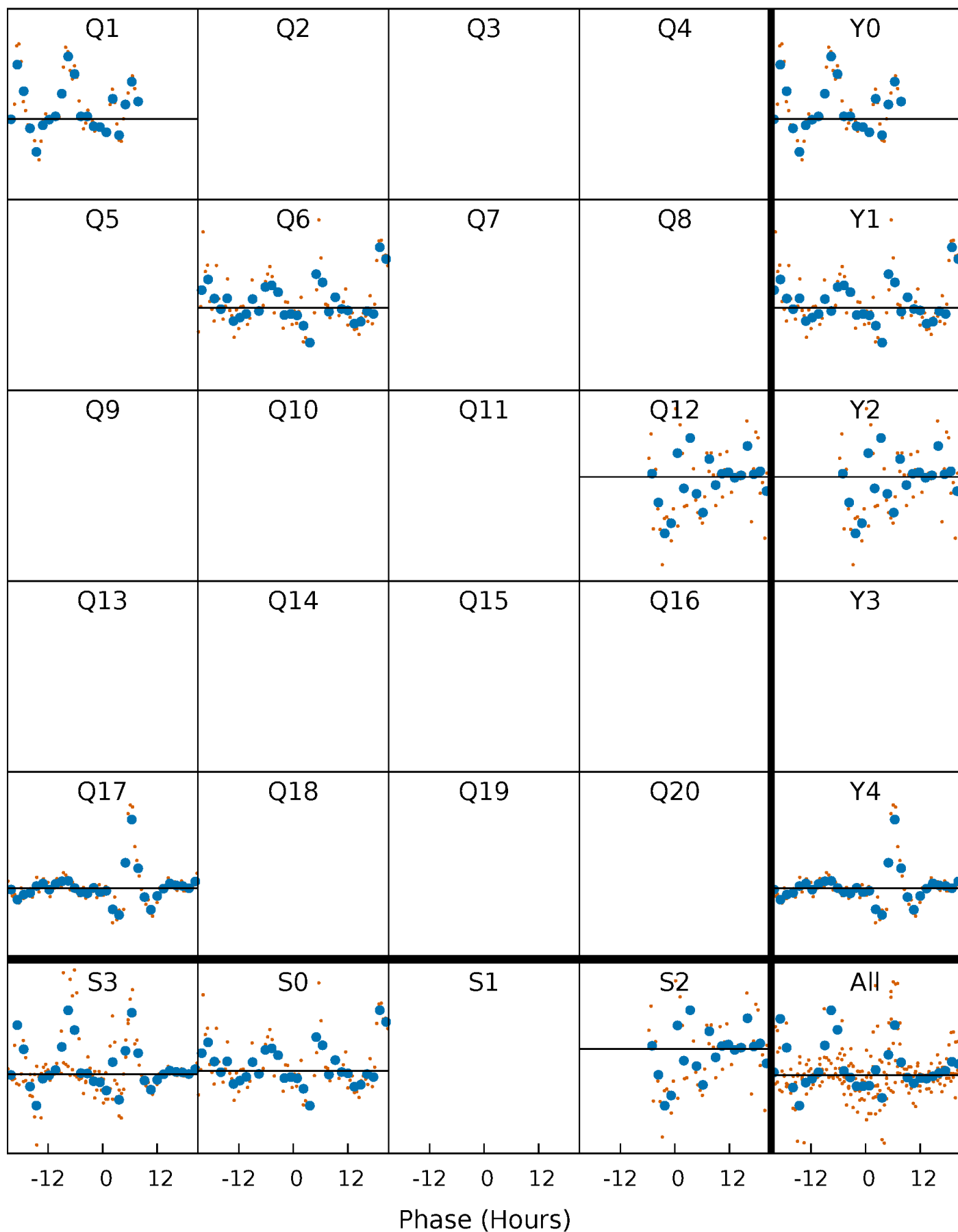
# PDC Quarter-Phased Transit Curves

TCE 009450669-06 P=476.653654 Days  $T_0=146.359381$  (BKJD)



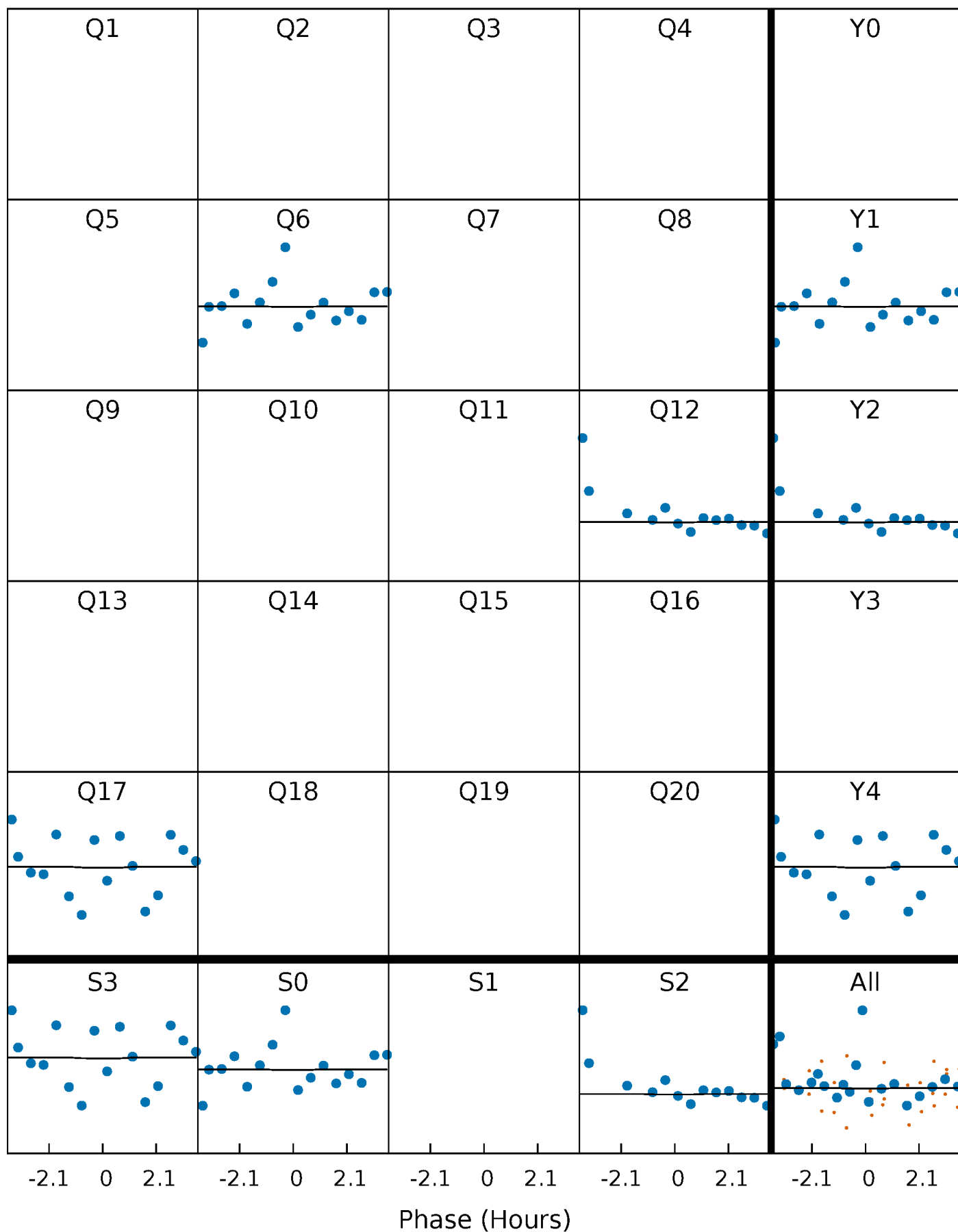
# DV Quarter-Phased Transit Curves

TCE 009450669-06     $P=476.653654$  Days     $T_0=146.359381$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

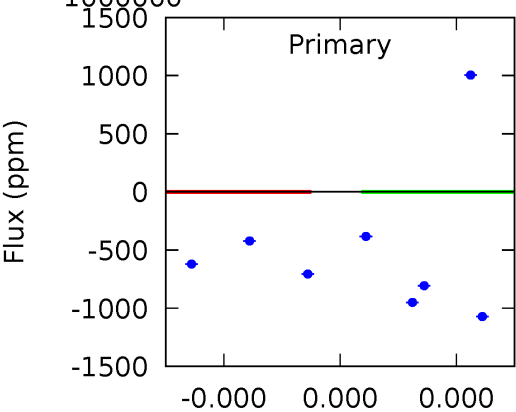
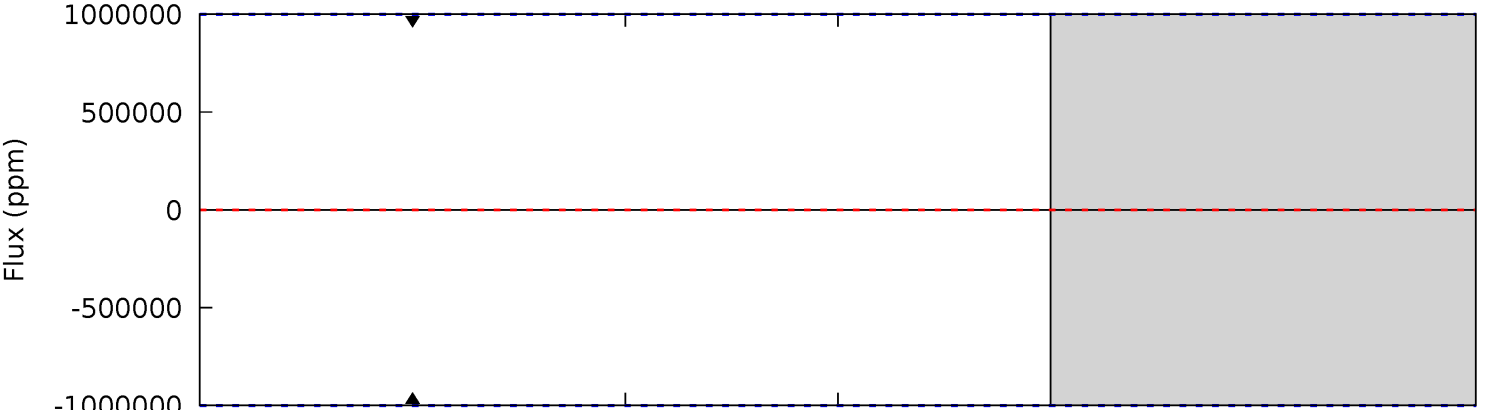
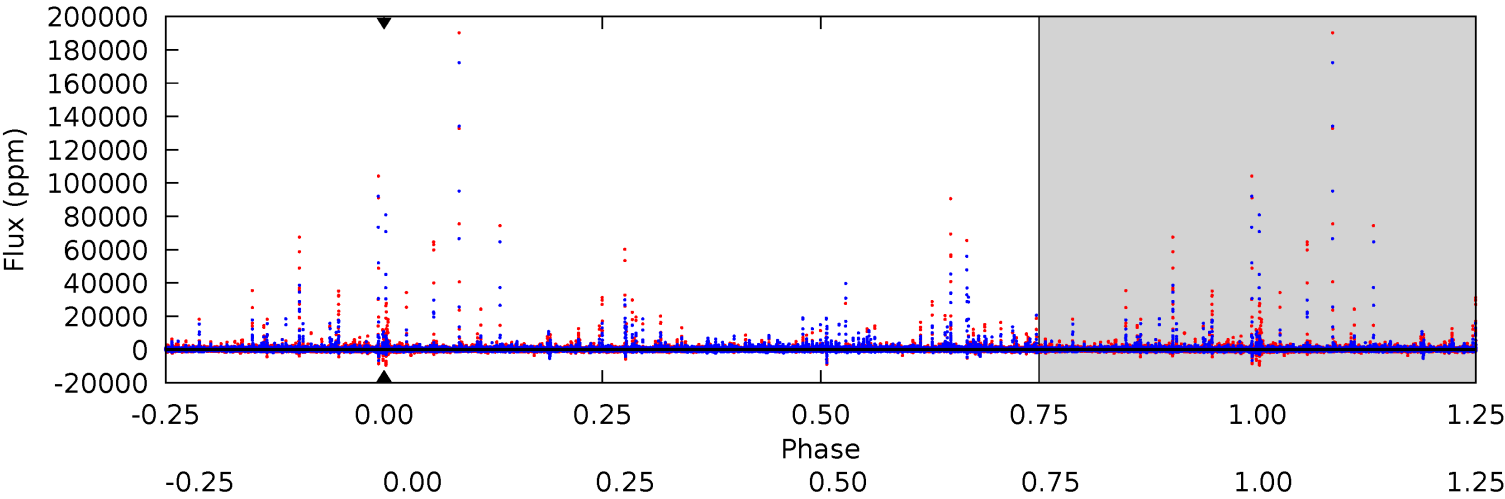
TCE 009450669-06 P=476.653654 Days  $T_0=146.849626$  (BKJD)



DV Model-Shift Uniqueness Test

009450669-06, P = 476.653654 Days, E = 146.359381 Days

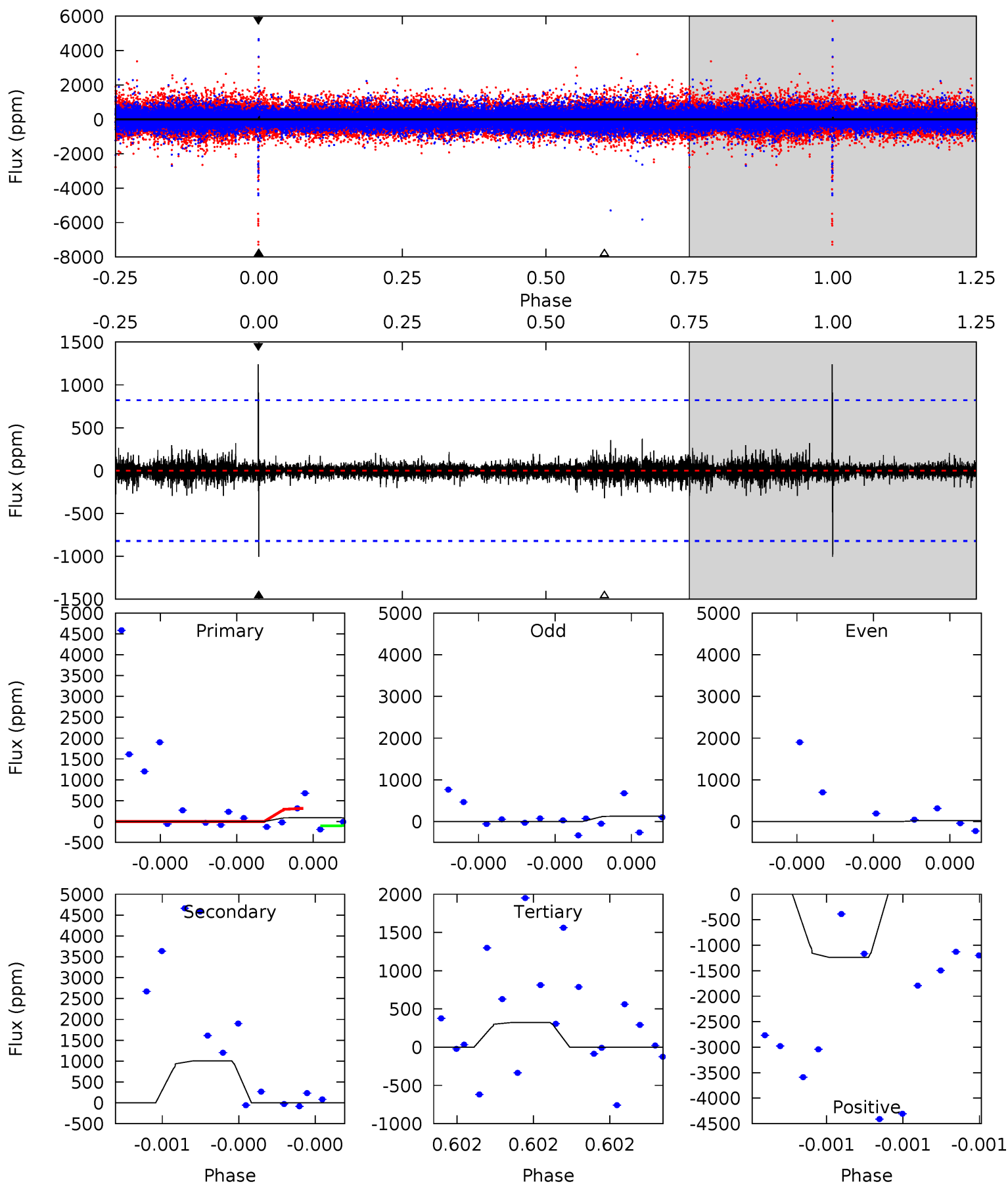
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009450669-06, P = 476.653654 Days, E = 146.849626 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.66	7.03	2.26	8.69	5.76	3.76	0.39	-1.60	-8.03	4.77	-1.66	0.27	4.06	0.55	0.70



### Stellar Parameters For KIC 009450669

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$5.07^{+5.60}_{-3.36}$	$230^{+8}_{-8}$	$-3941^{+16462}_{-8484}$	$-40771.084^{+3305823.168}_{-3120774.738}$
Alt.	$-1003 \pm 143$	$4.36^{+4.88}_{-3.18}$	$230^{+9}_{-8}$	$3686^{+2449}_{-753}$	$29196^{+343526}_{-22797}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

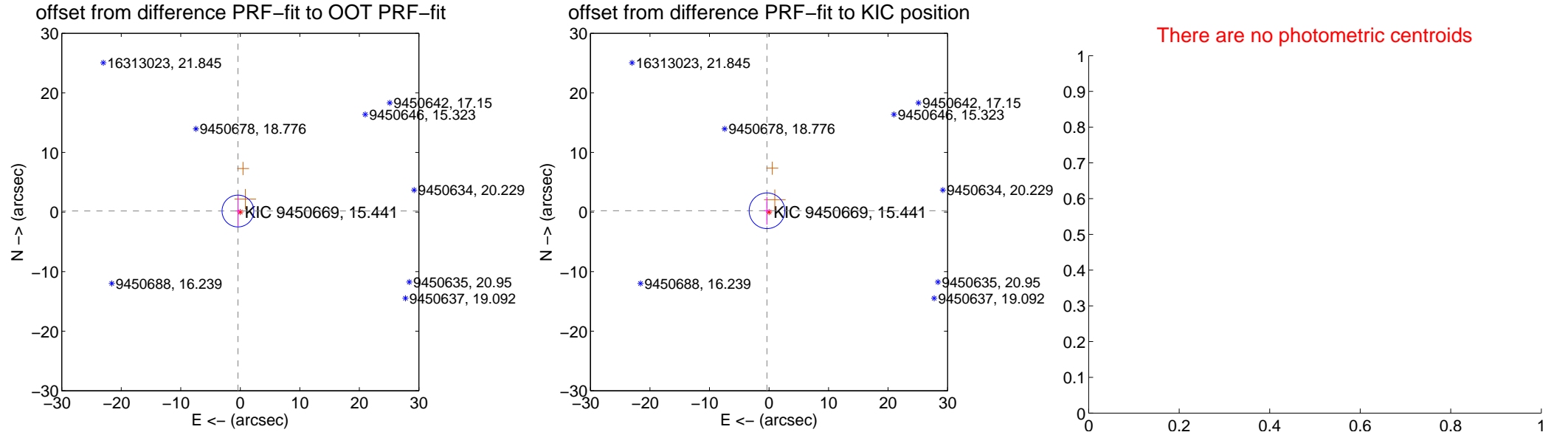
## DV Centroid Data

Supplemental centroid analysis for 009450669-06. Kepler magnitude: 15.44. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

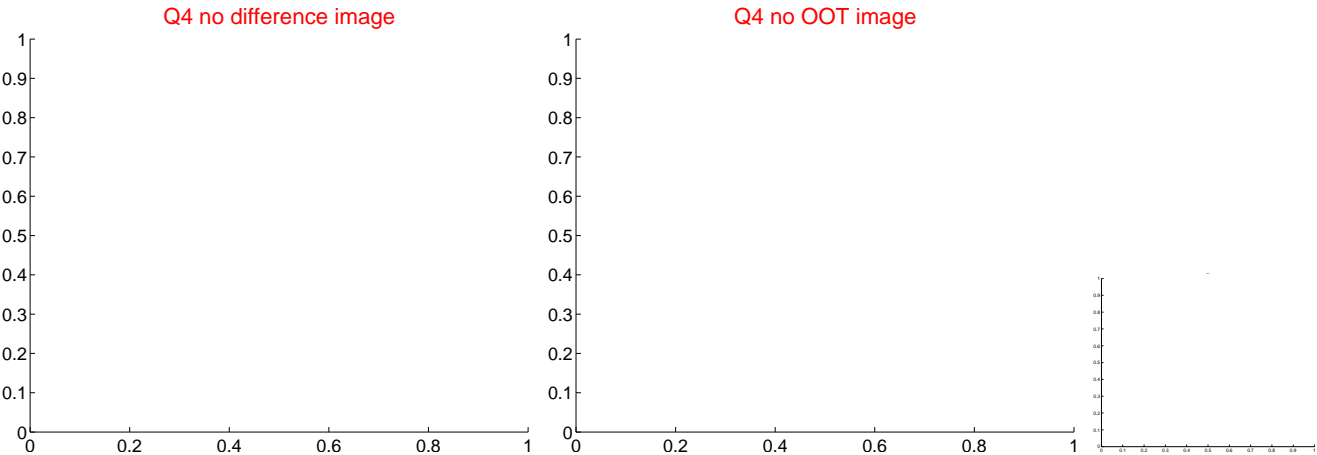
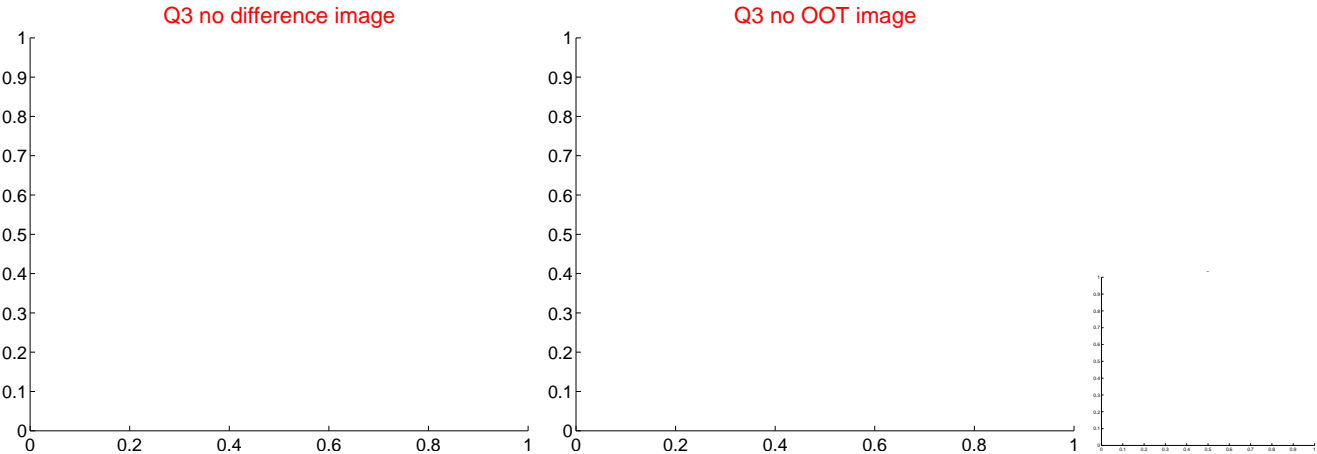
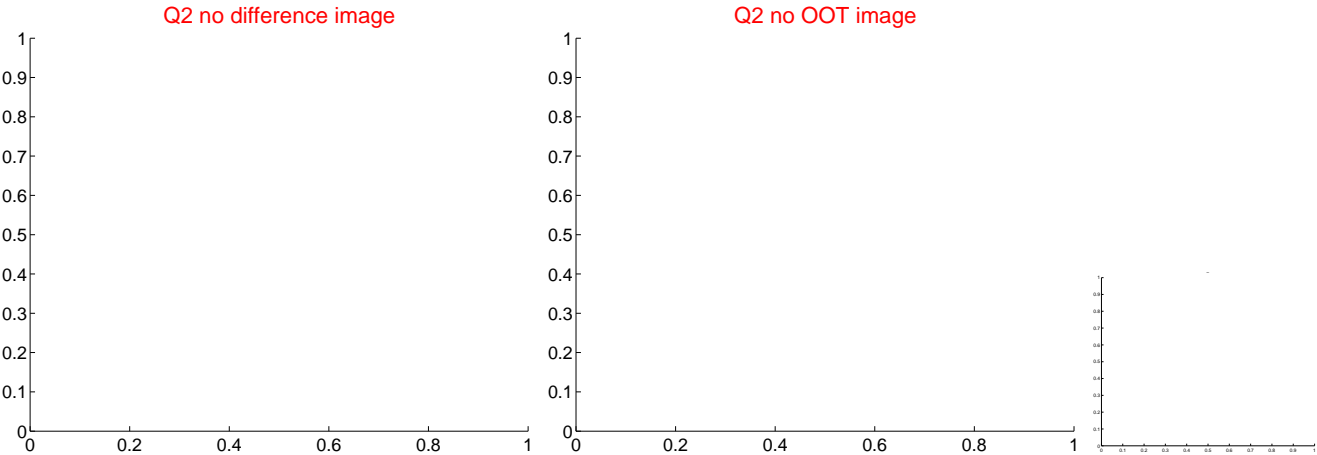
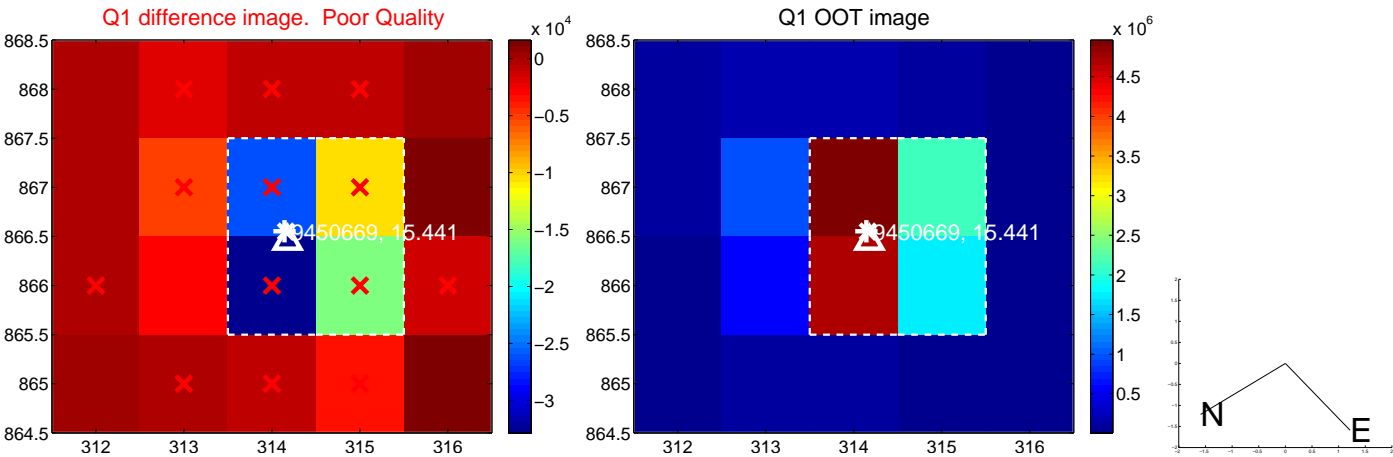
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.433 \pm 0.890$	0.49	$0.397 \pm 0.372$	$0.172 \pm 2.558$
PRF-fit source offset from KIC position	$0.404 \pm 0.998$	0.41	$0.342 \pm 0.482$	$0.216 \pm 2.336$
photometric centroid source offset	—	—	—	—



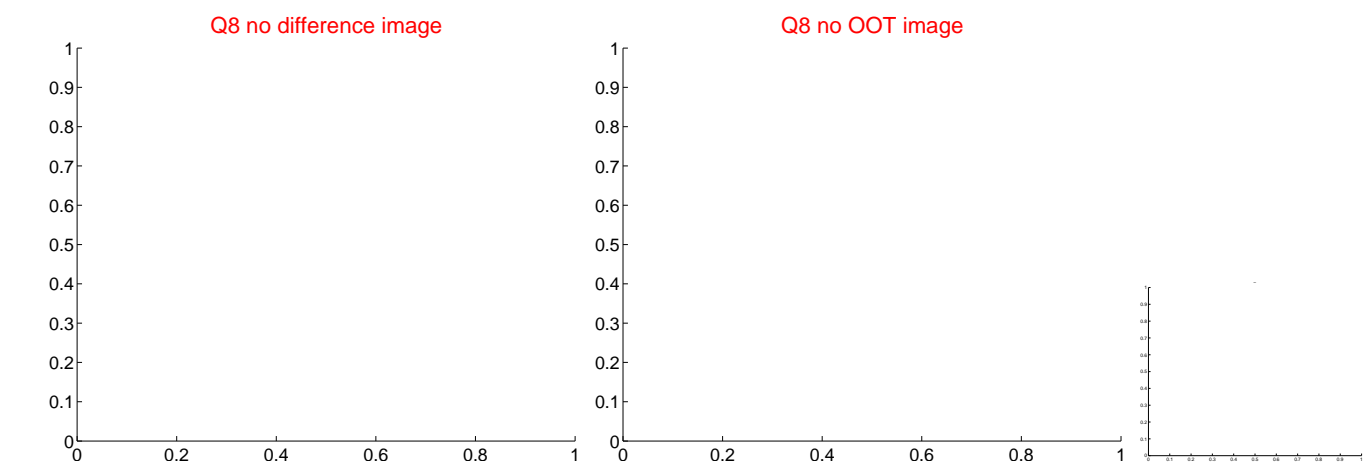
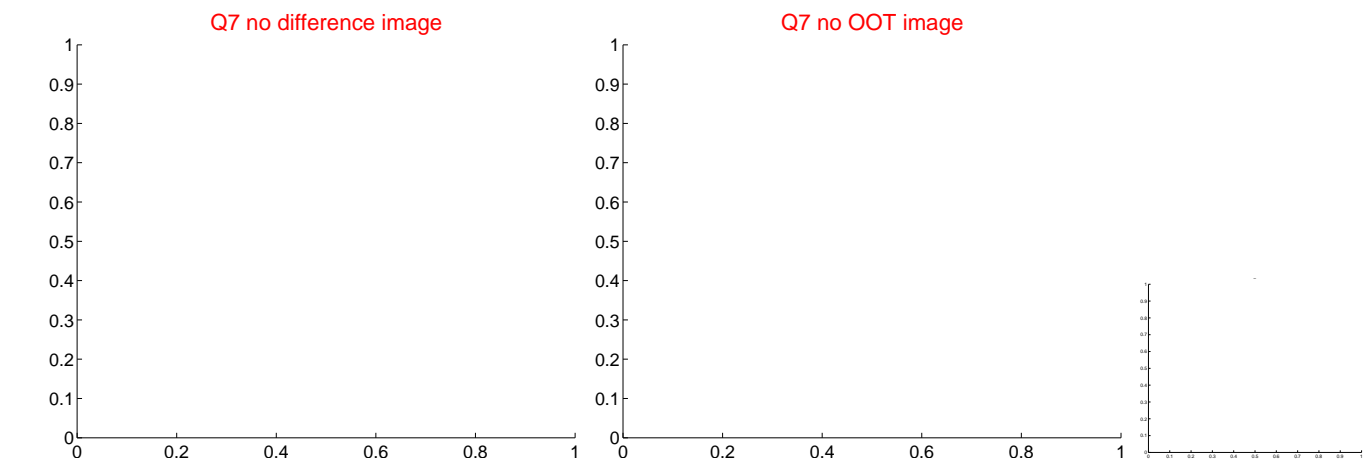
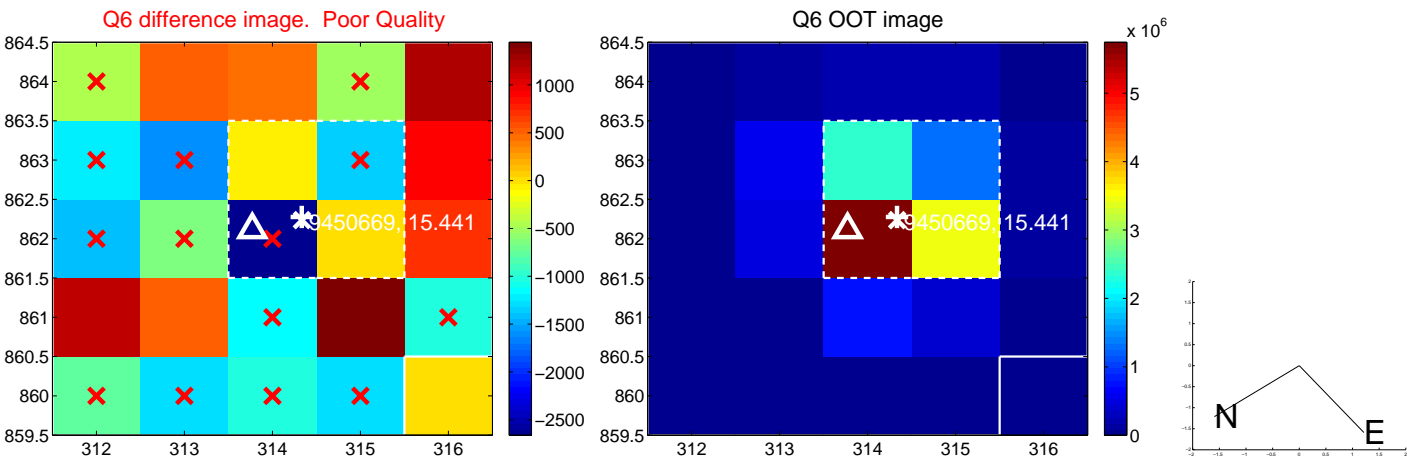
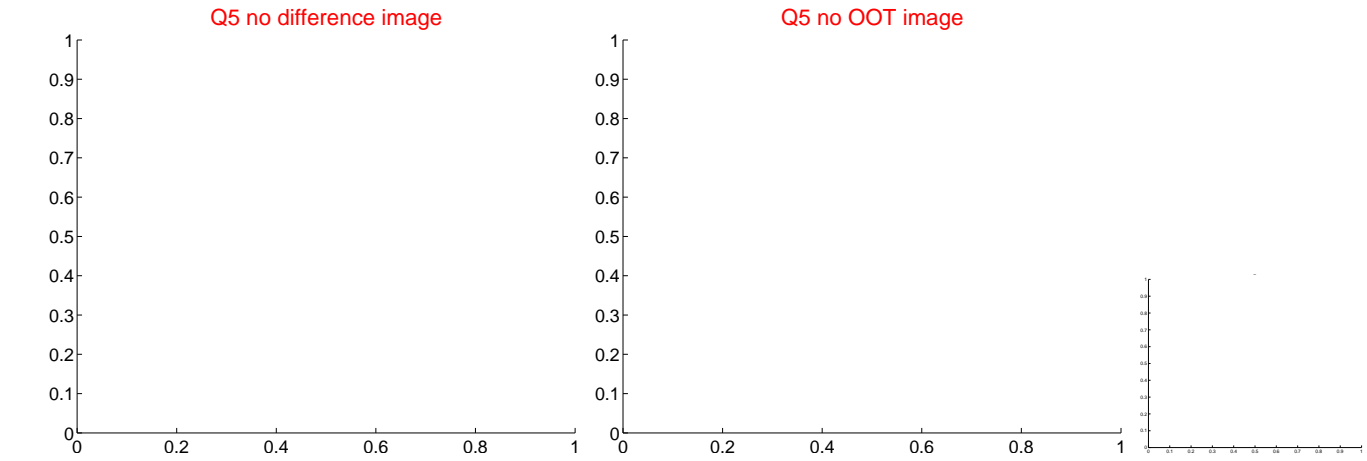
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



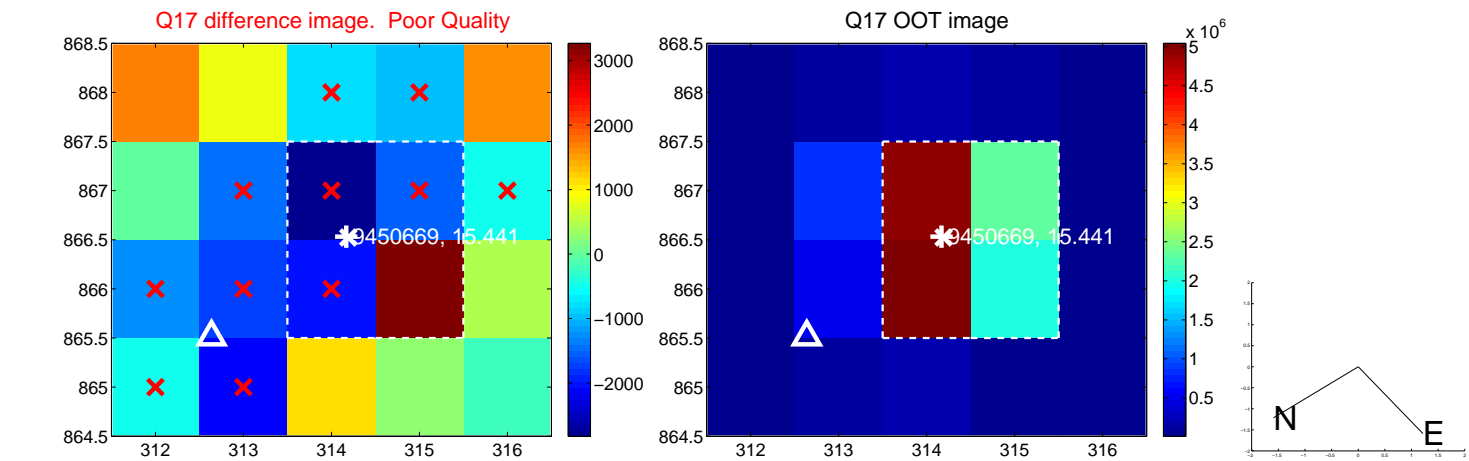
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



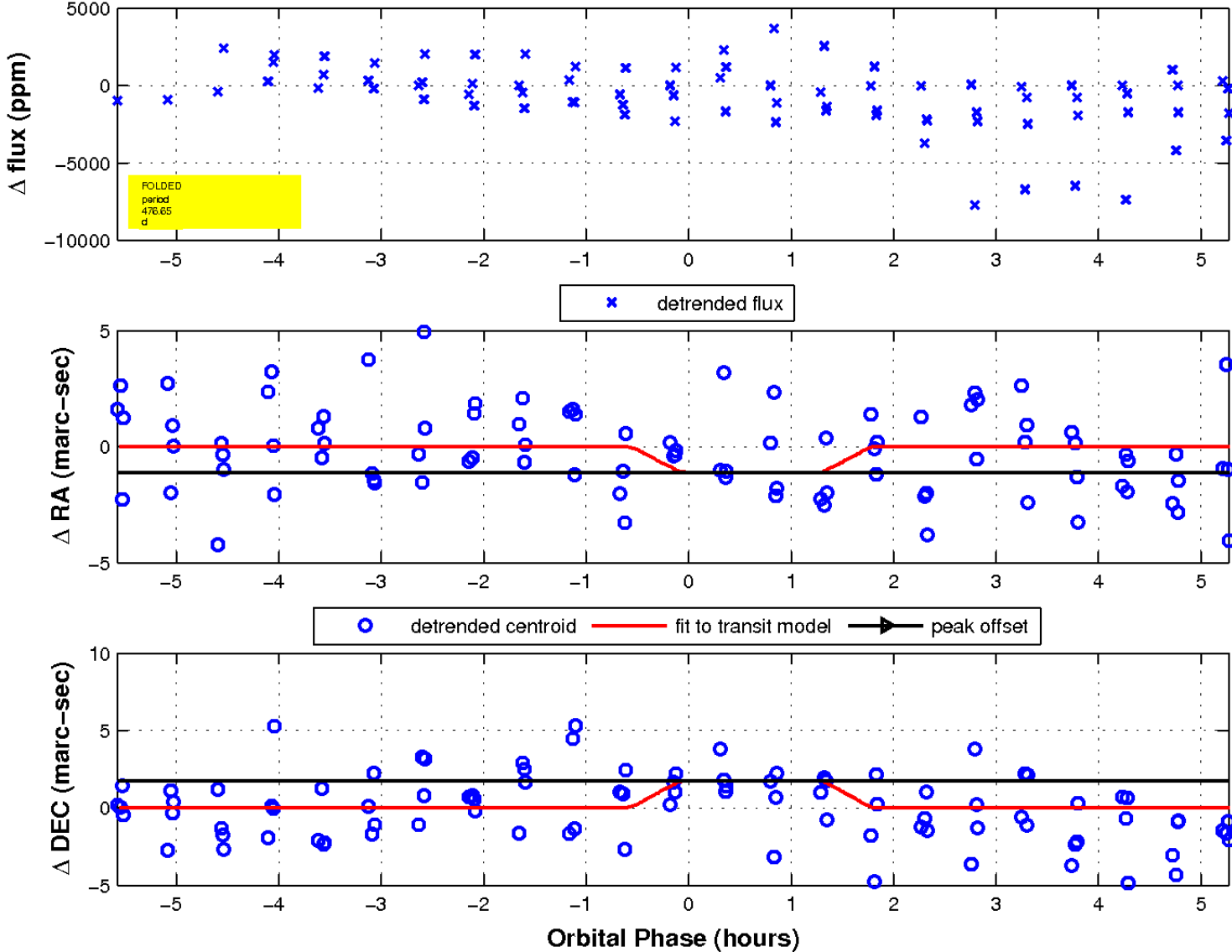
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

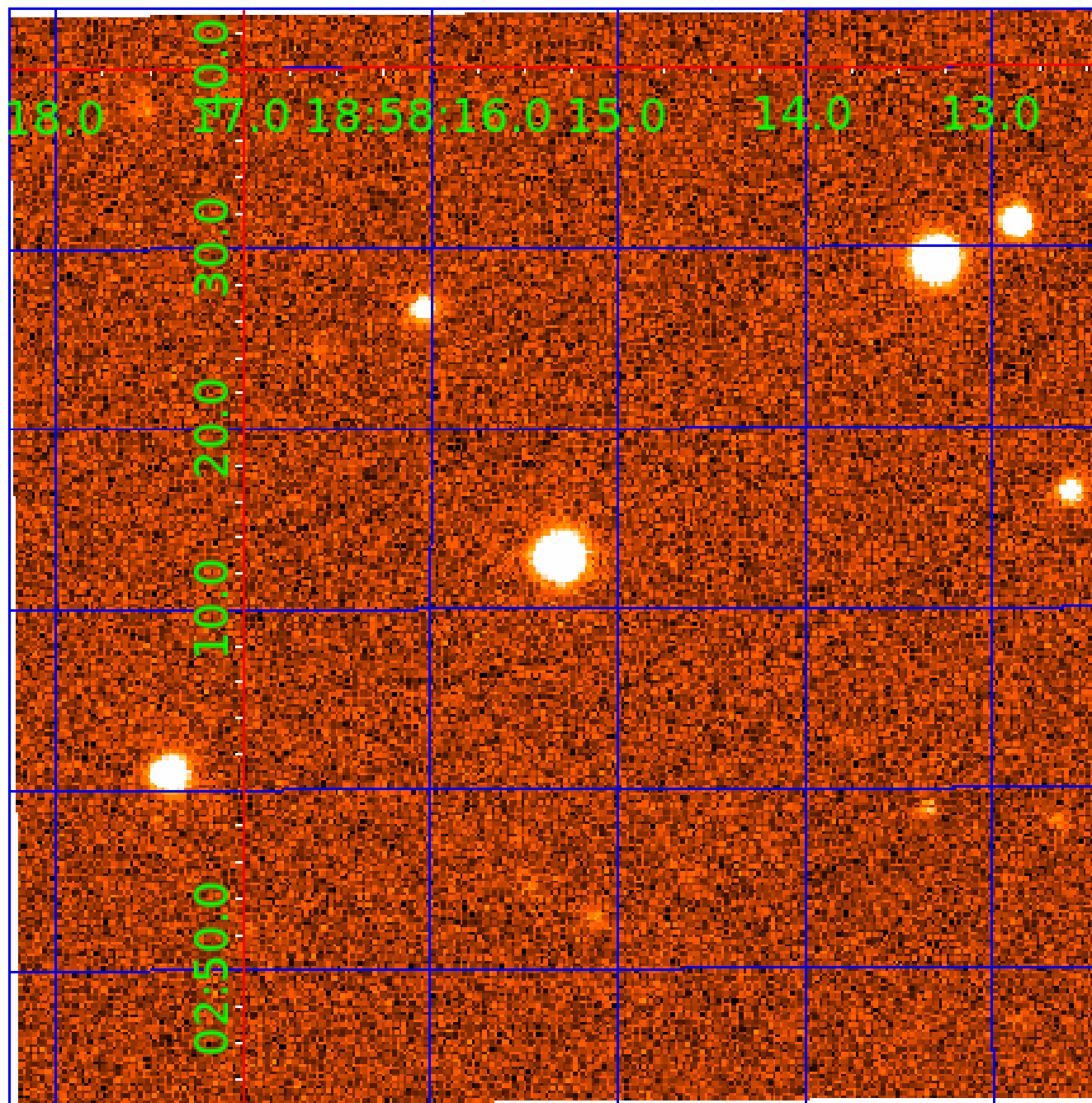


fluxWeightedCentroids, Planet 6 of 7



UKIRT Image

Declination



# KIC 009450669

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009450669-01	OBS	No	592.877880	147.031118	3560.3	5.431	21.5	10.5	0.59	4866	3.45	0.13
009450669-02	OBS	No	478.087940	234.703569	3454.2	12.306	17.3	9.5	0.59	4866	3.94	0.17
009450669-03	OBS	No	308.327828	374.263208	2327.8	5.229	18.0	9.1	0.59	4866	4.63	0.32
009450669-04	OBS	No	545.110344	236.416352	3176.8	4.963	17.3	11.3	0.59	4866	3.68	0.15
009450669-05	OBS	No	639.970752	177.323963	2264.6	4.765	16.7	7.6	0.59	4866	2.90	0.12
009450669-06	OBS	No	476.653654	146.359381	2007.5	10.500	16.8	-1.0	0.59	4866	2.59	0.18
009450669-07	OBS	No	398.801790	236.873240	1893.9	7.500	16.4	-1.0	0.59	4866	2.52	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009450669-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009450669-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
009450669-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
009450669-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009450669-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
009450669-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

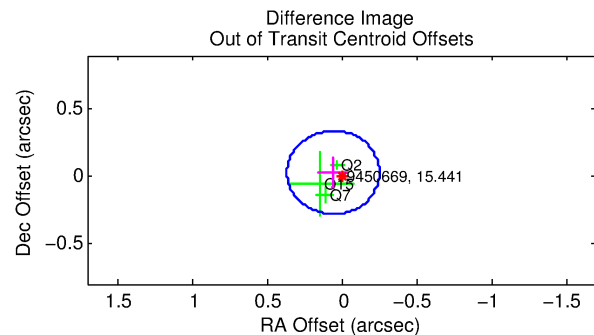
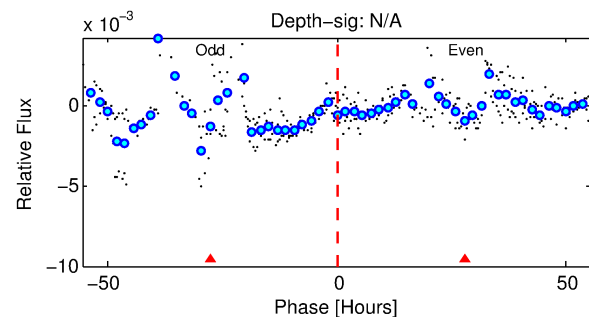
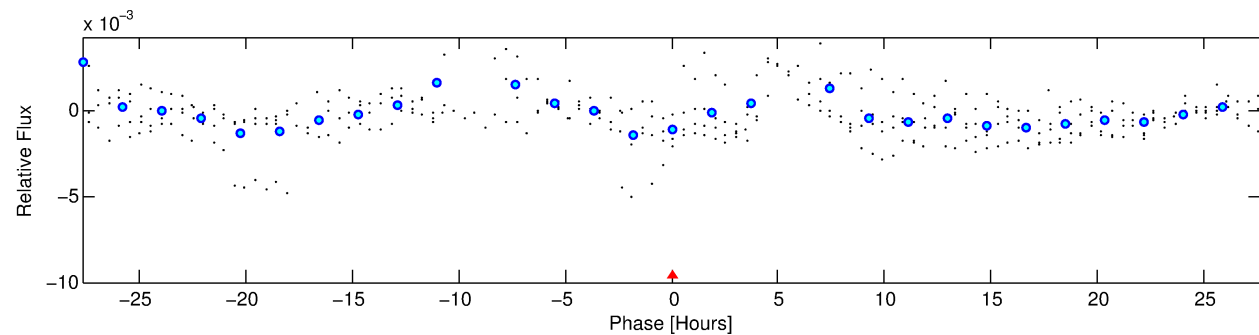
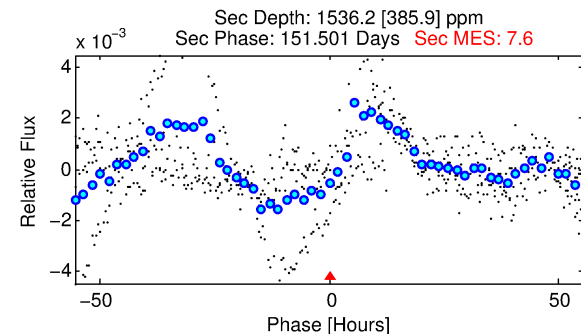
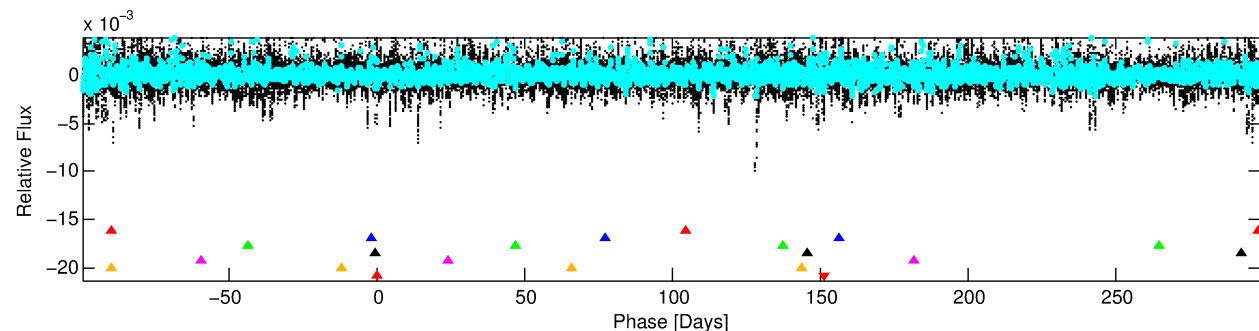
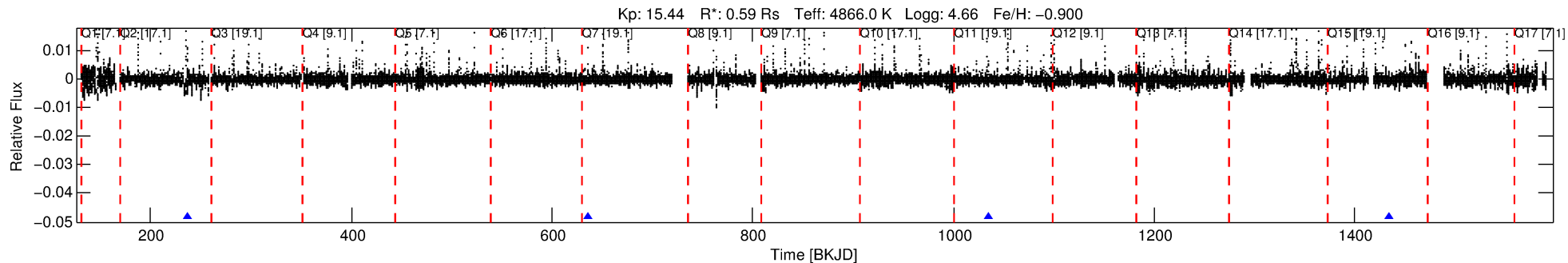
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009450669-07

No Significant Match Found

# DV One-Page Summary

KIC: 9450669 Candidate: 7 of 7 Period: 398.802 d



## TPS TCE Results:

Period = 398.80179 d  
Epoch = 236.8732 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

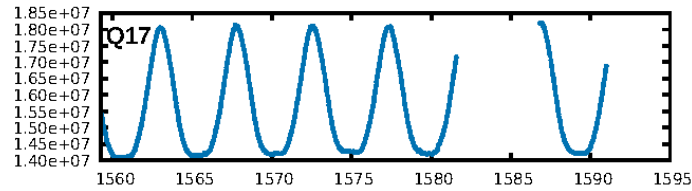
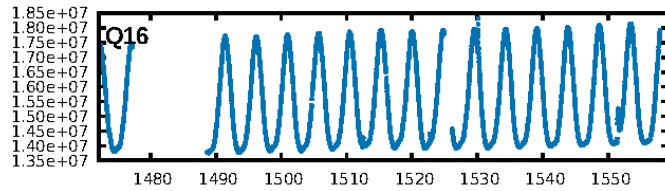
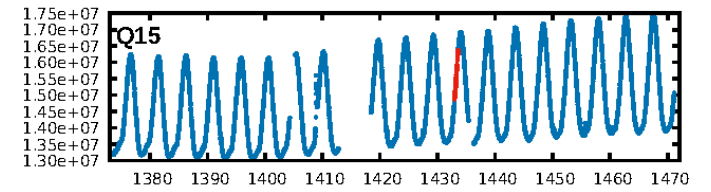
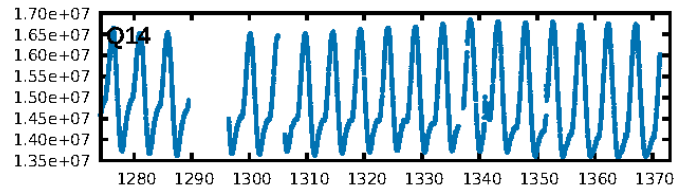
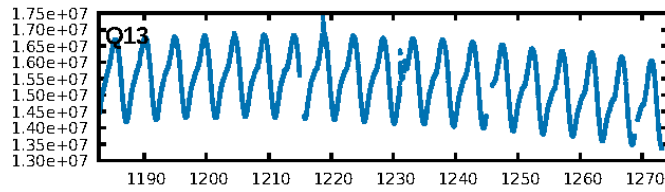
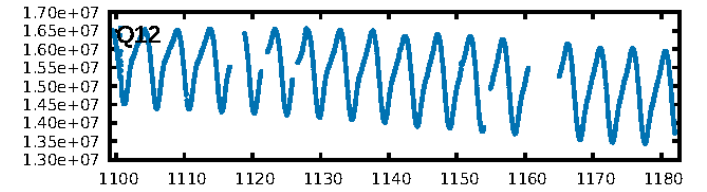
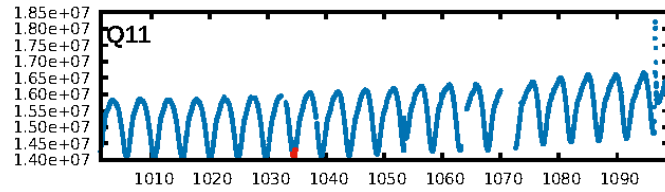
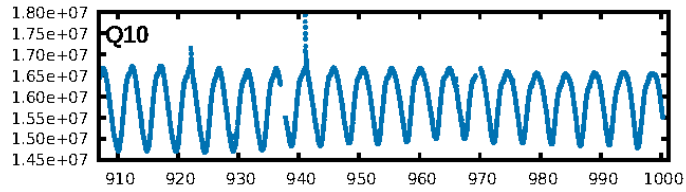
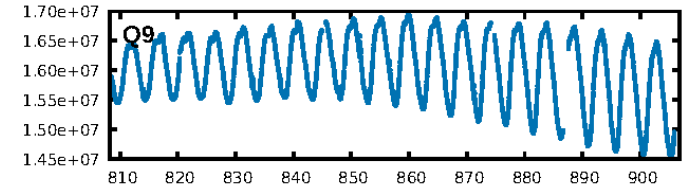
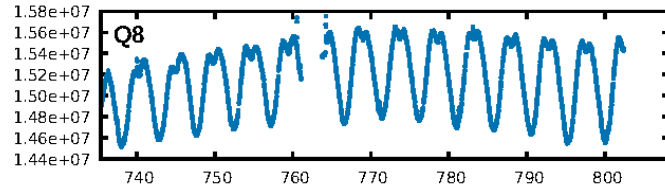
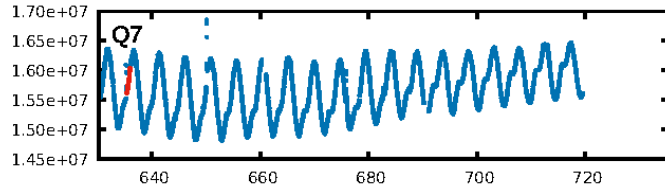
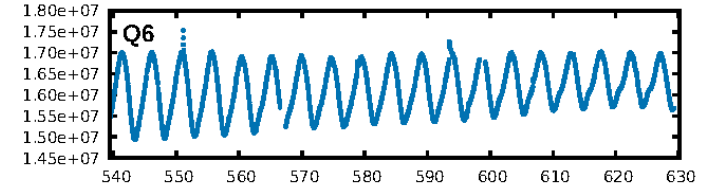
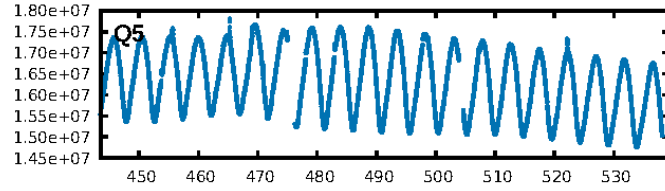
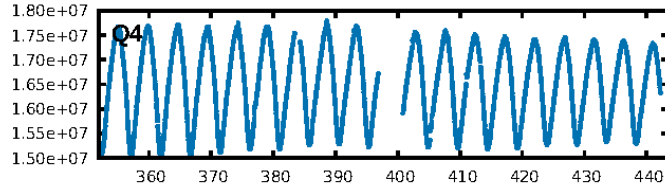
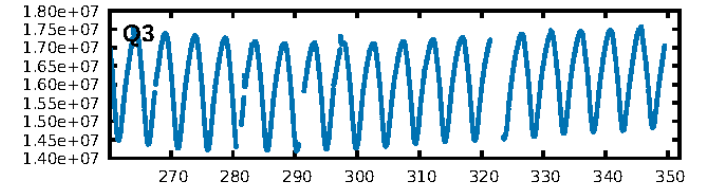
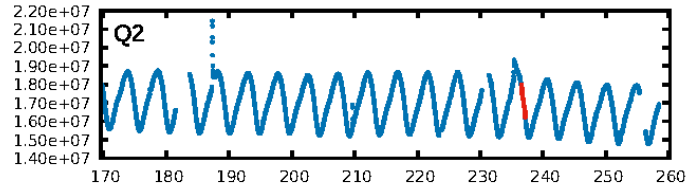
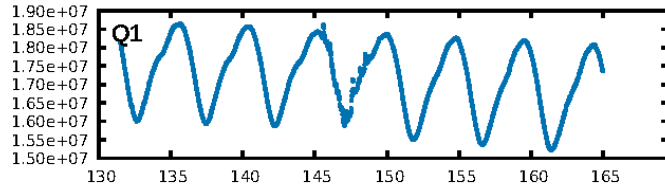
ShortPeriod-sig: 100.0% [237.50σ]  
LongPeriod-sig: 100.0% [144.80σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 14.27

Centroid-sig: 94.9%  
Centroid-so: 0.048 arcsec [0.58σ]  
OotOffset-rm: 0.063 arcsec [0.61σ]  
KicOffset-rm: 0.059 arcsec [0.57σ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:46:05 Z

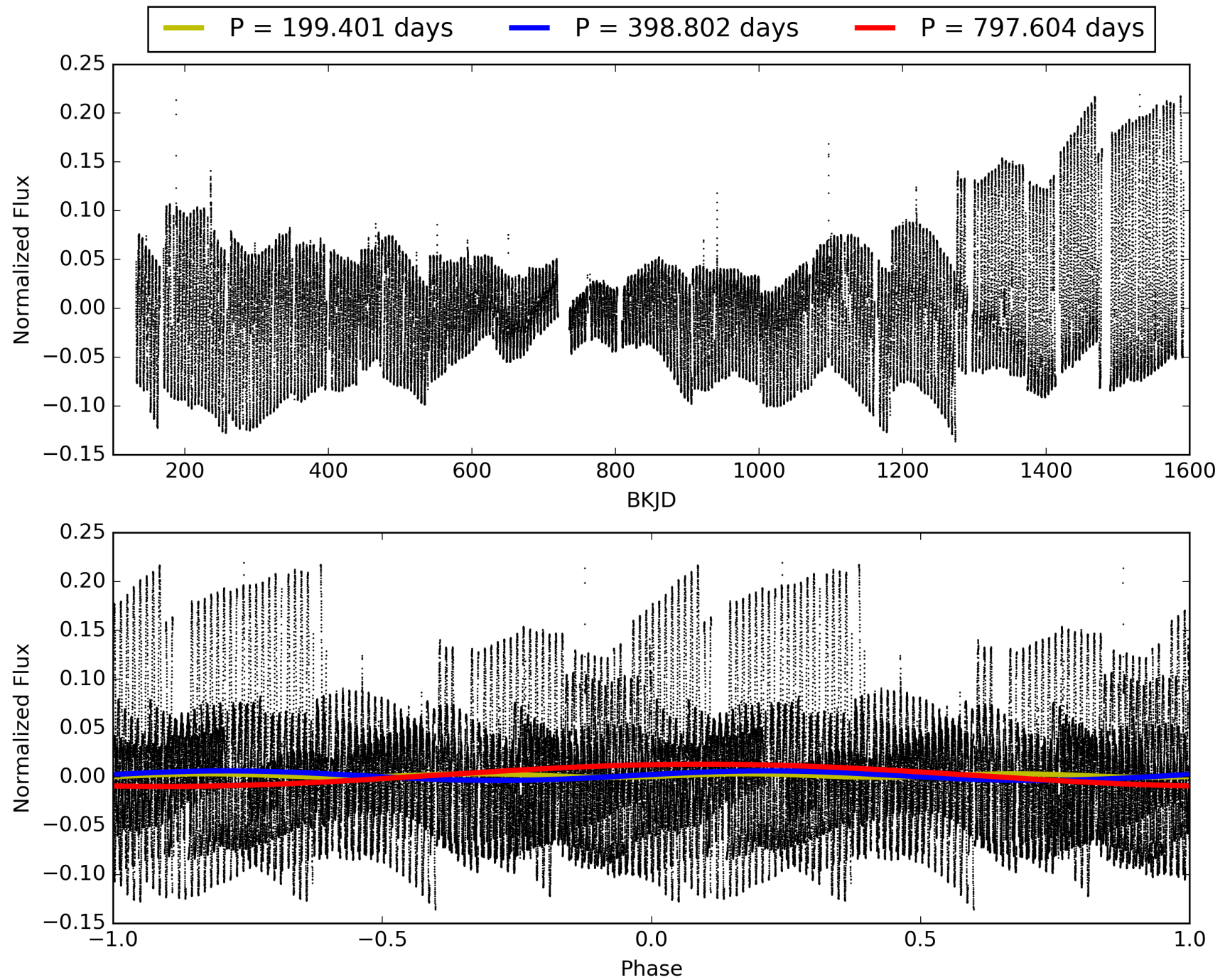
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009450669-07, PDC Light Curves



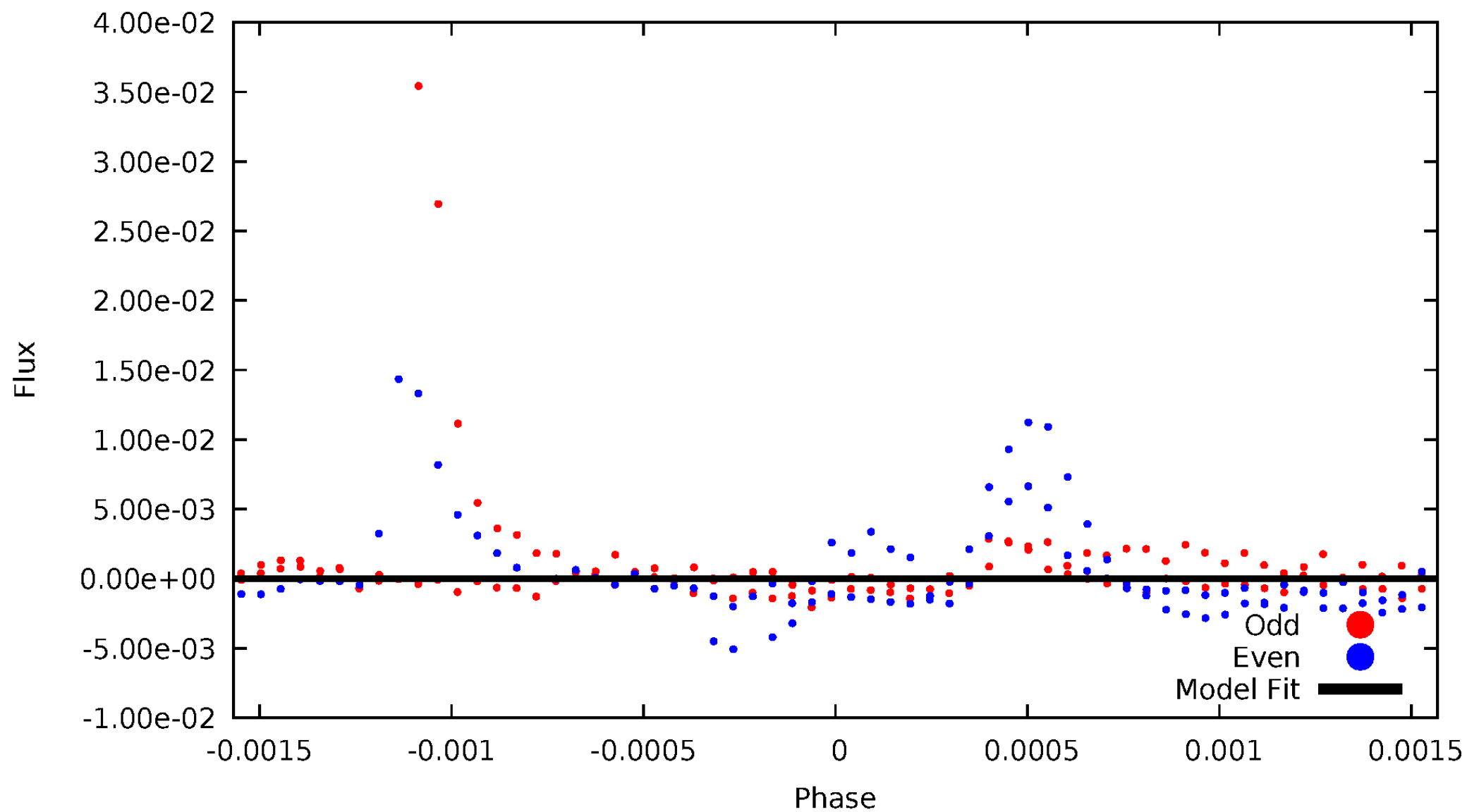


TCE 009450669-07



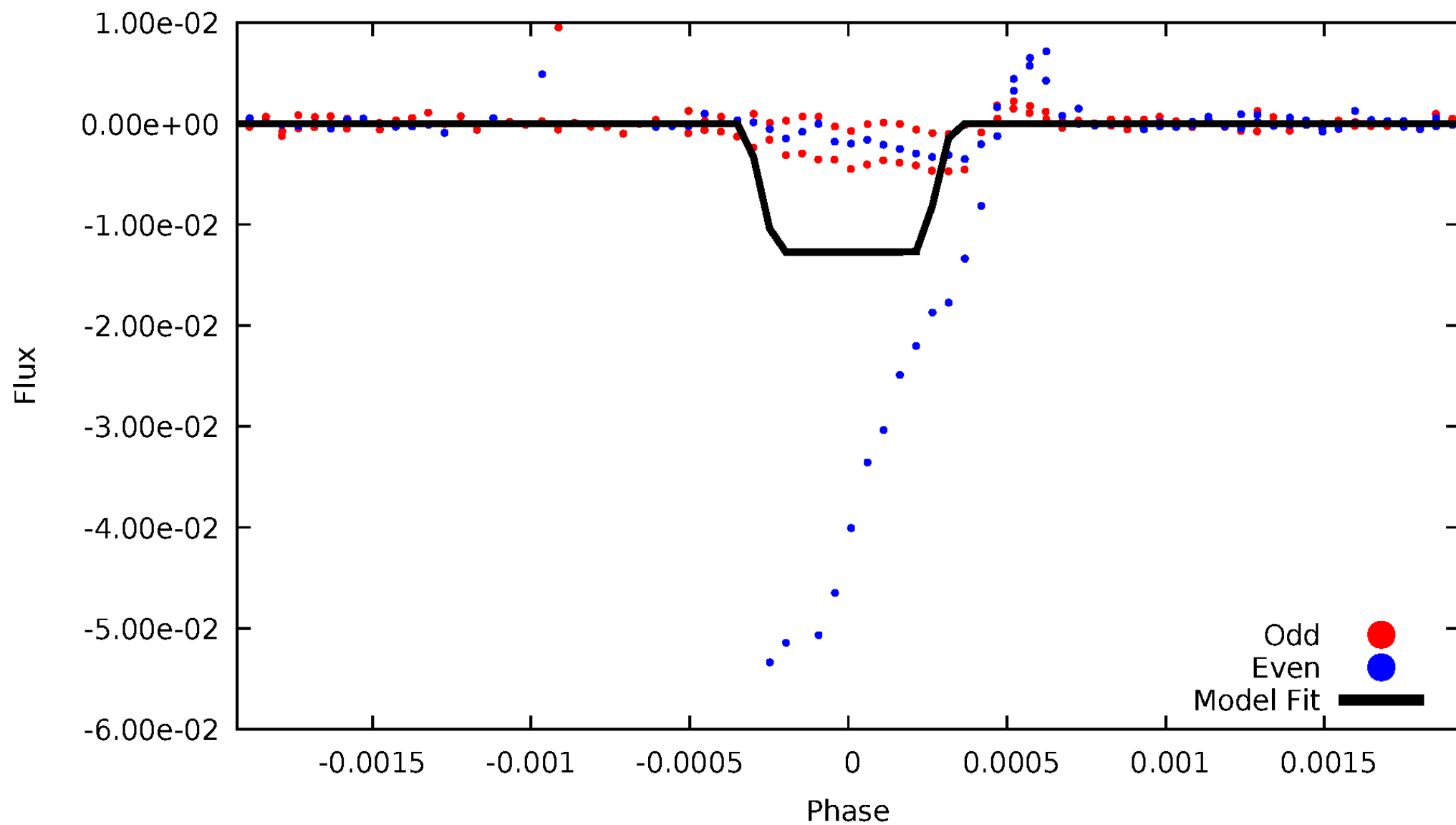
# DV Odd/Even

TCE 009450669-07



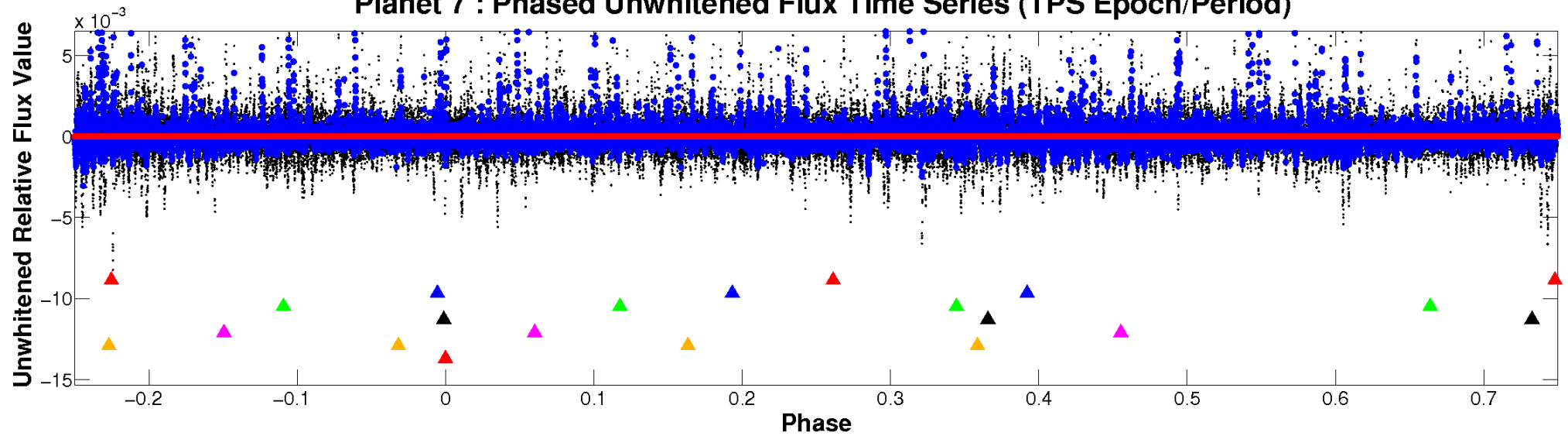
# ALT Odd/Even

TCE 009450669-07

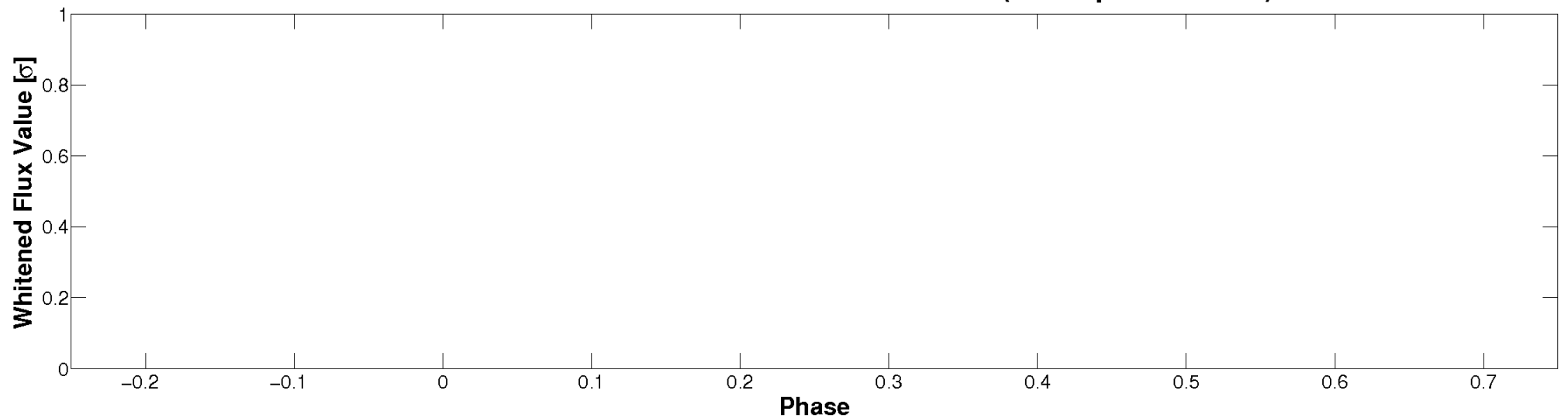


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

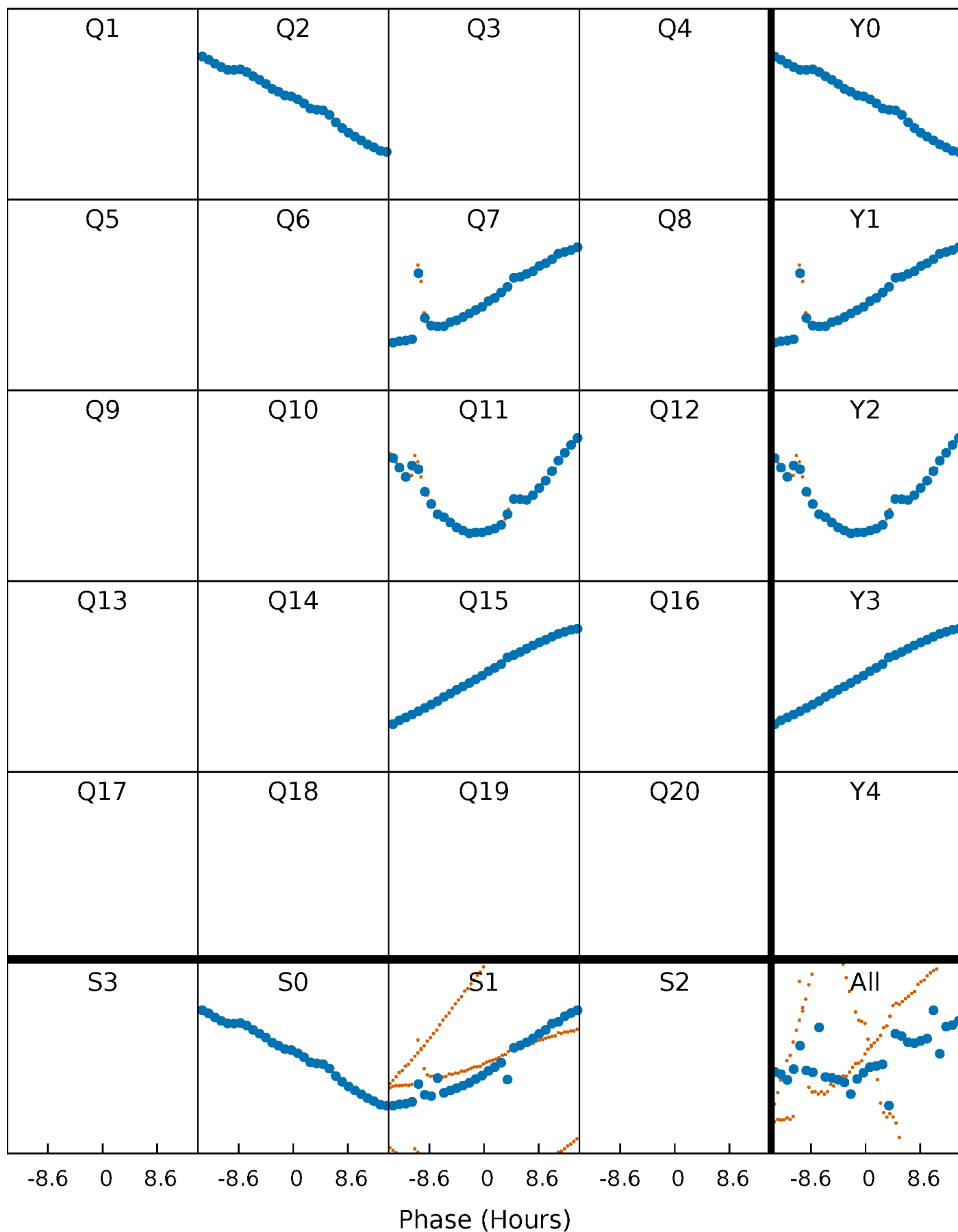


Planet 7 : Phased Whitened Flux Time Series (TPS Epoch/Period)



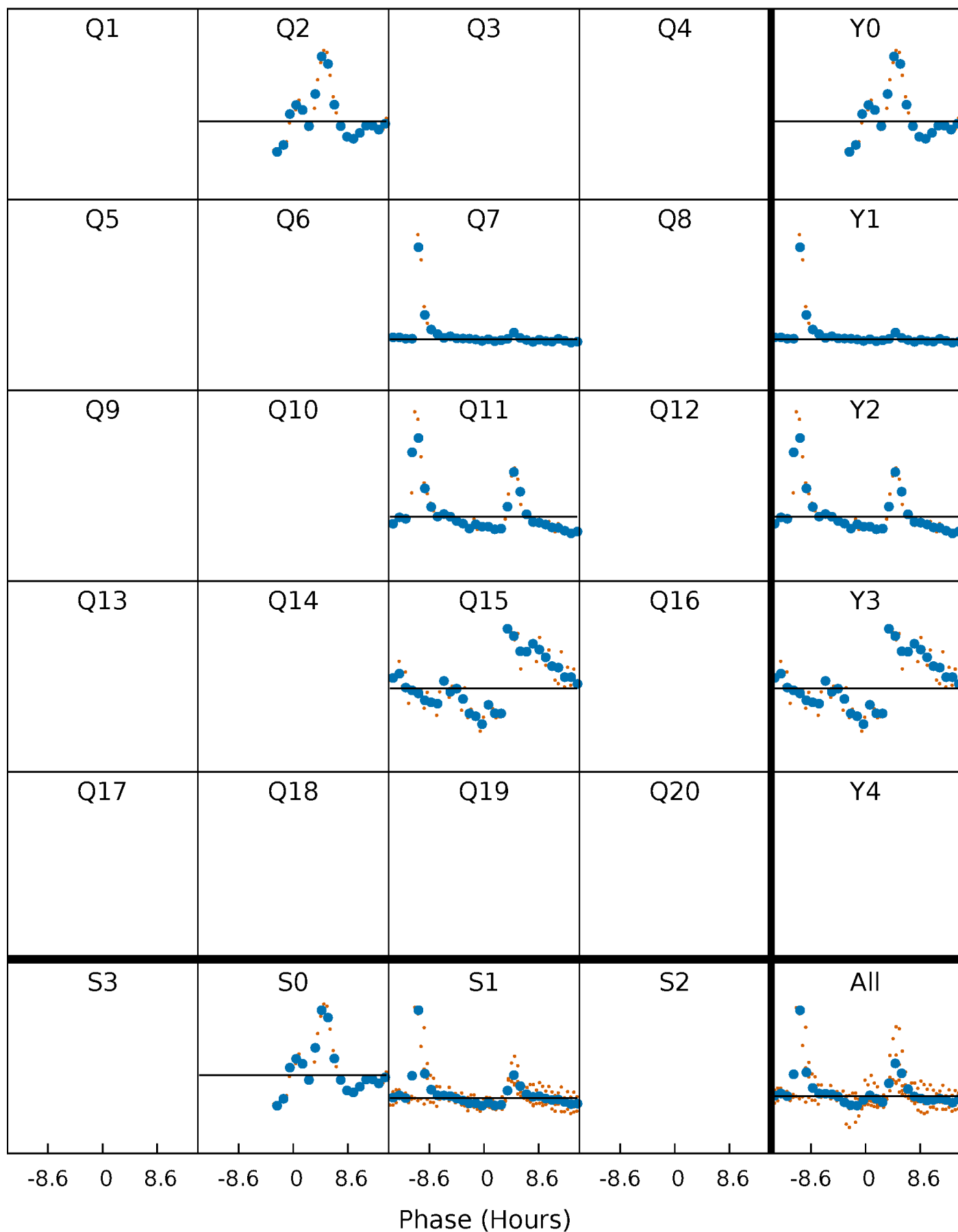
# PDC Quarter-Phased Transit Curves

TCE 009450669-07     $P=398.801790$  Days     $T_0=236.873240$  (BKJD)



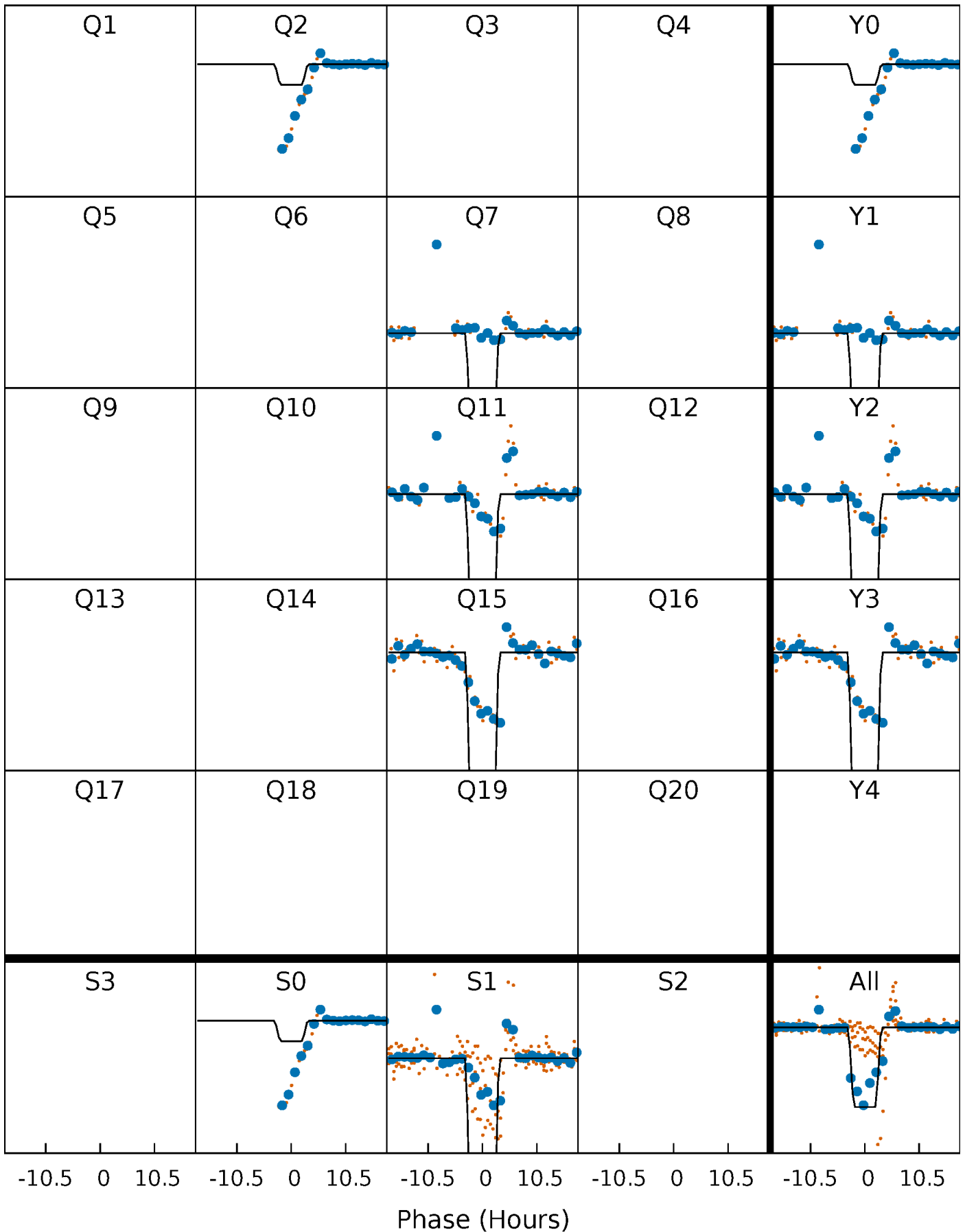
# DV Quarter-Phased Transit Curves

TCE 009450669-07     $P=398.801790$  Days     $T_0=236.873240$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

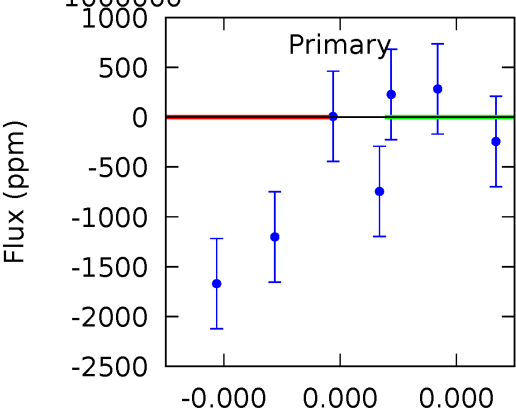
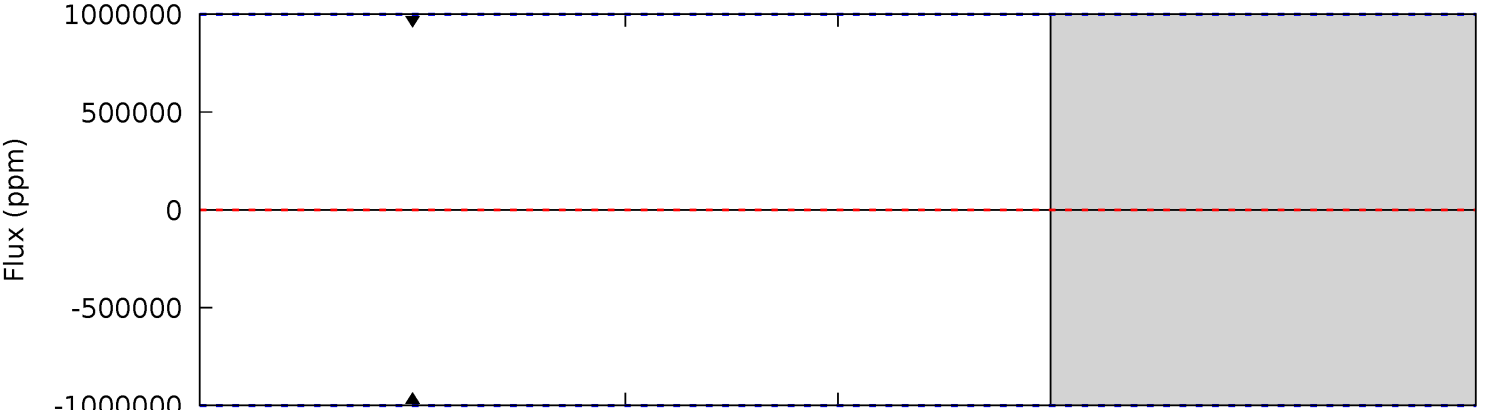
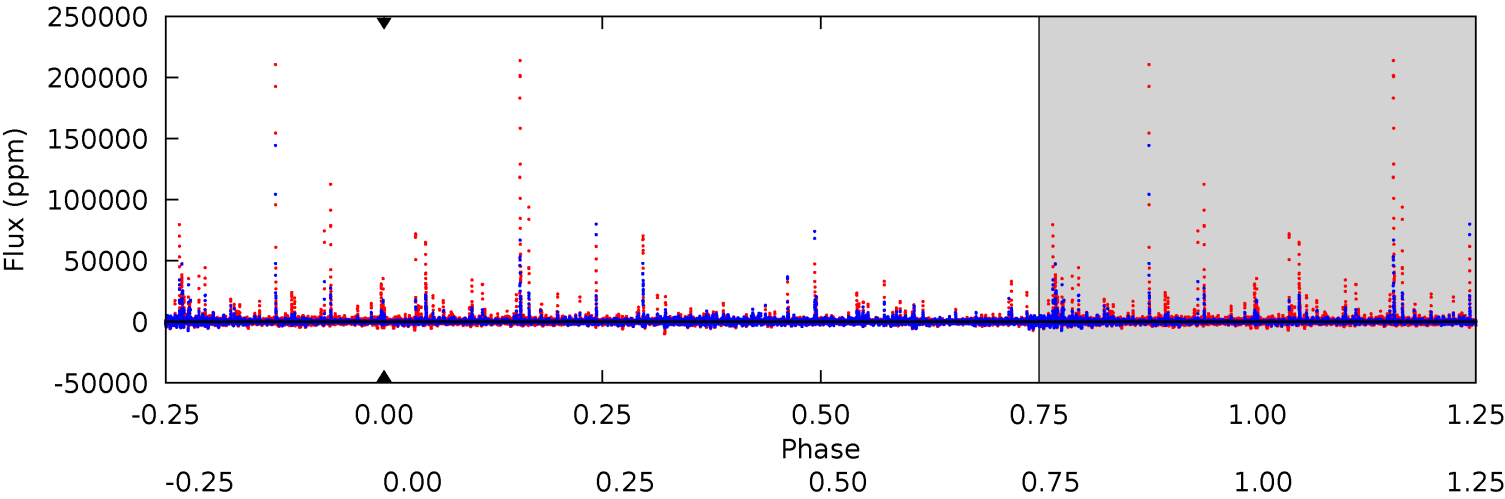
TCE 009450669-07 P=398.801790 Days  $T_0=236.845336$  (BKJD)



# DV Model-Shift Uniqueness Test

009450669-07, P = 398.801790 Days, E = 236.873240 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0

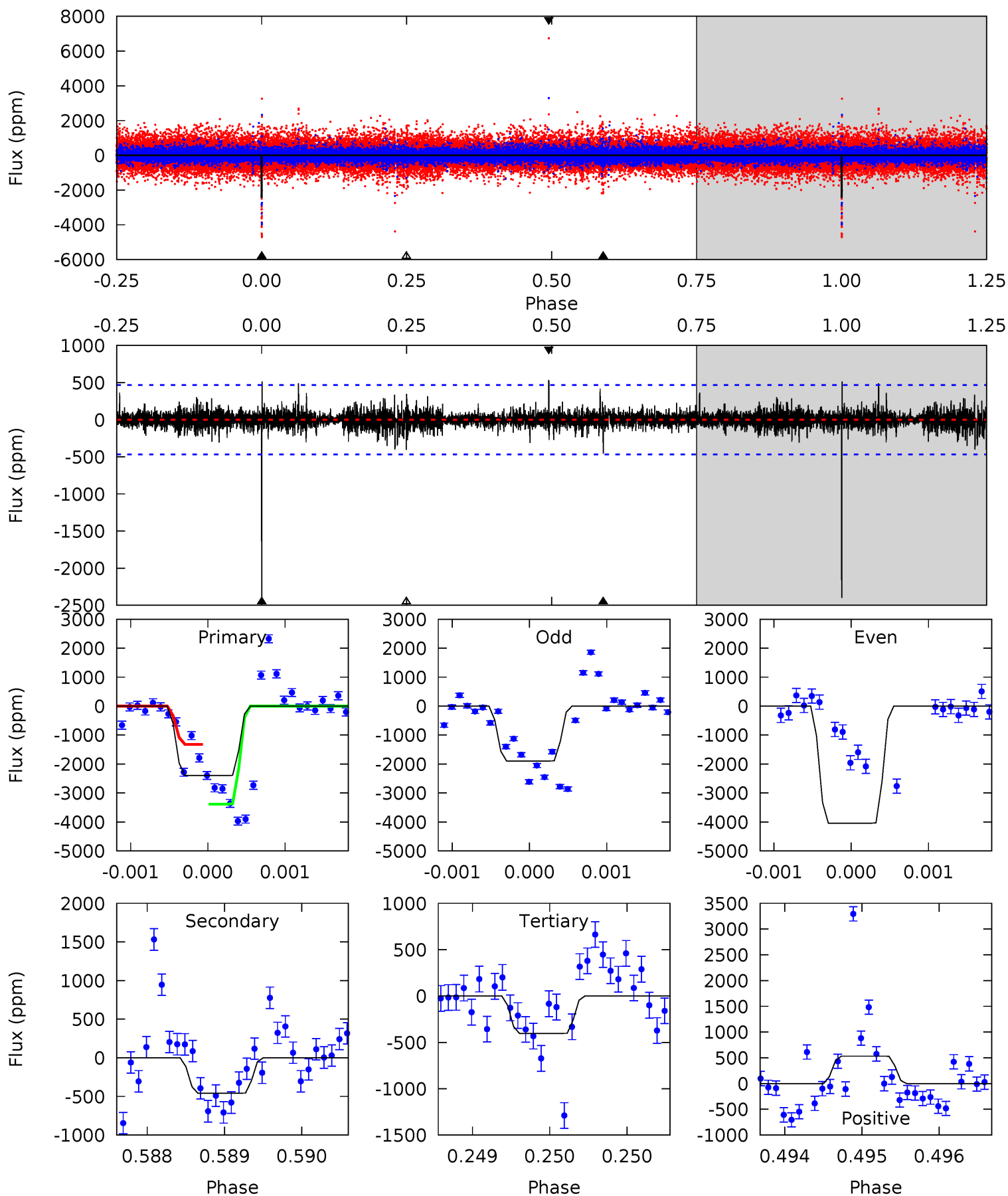




# Alt Model-Shift Uniqueness Test

009450669-07, P = 398.801790 Days, E = 236.845336 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.4	5.42	4.78	6.31	5.52	3.40	0.82	23.6	22.1	0.65	-0.89	11.5	4.02	0.18	11.8



### Stellar Parameters For KIC 009450669

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4866^{+161}_{-146}$	$4.662^{+0.052}_{-0.036}$	$-0.900^{+0.300}_{-0.300}$	$0.593^{+0.049}_{-0.041}$	$0.588^{+0.055}_{-0.025}$	$3.980^{+0.834}_{-0.574}$
	+3%/-3%	+1%/-1%	+33%/-33%	+8%/-7%	+9%/-4%	+21%/-14%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009450669-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$5.32^{+5.25}_{-3.60}$	$244^{+9}_{-9}$	$2975^{+11002}_{-14944}$	$6266^{+3288022}_{-2373552}$
Alt.	$-458 \pm 85$	$8.38^{+5.83}_{-5.11}$	$244^{+9}_{-9}$	$2721^{+862}_{-358}$	$2900^{+16607}_{-1945}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

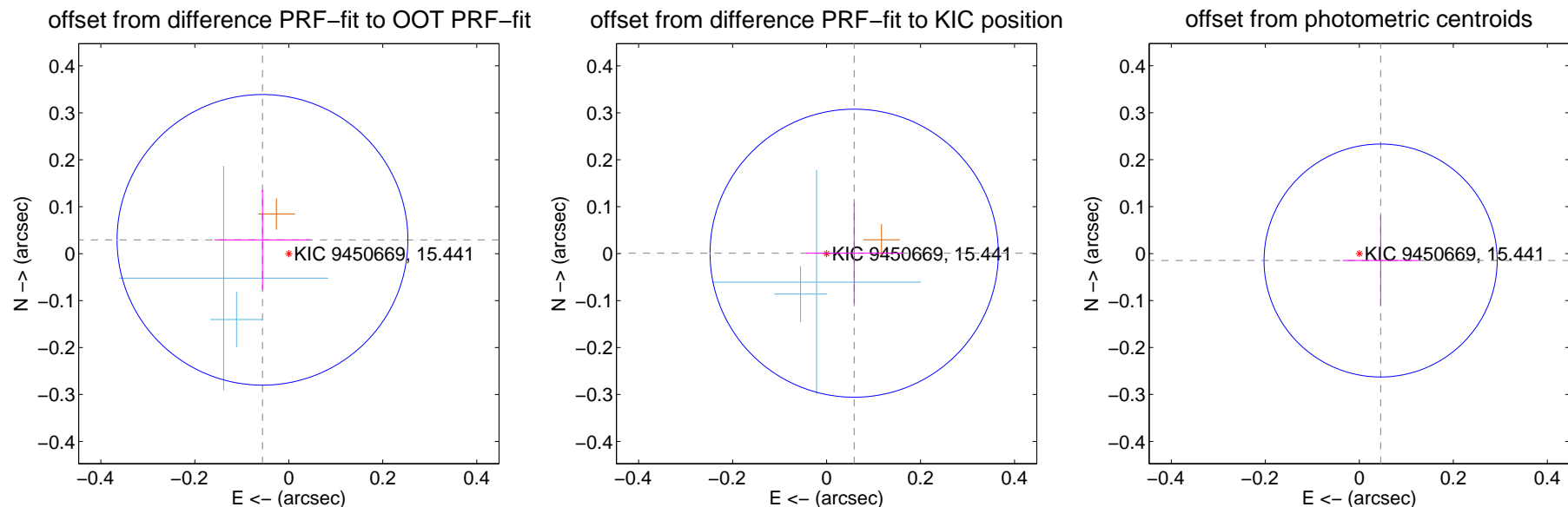
## DV Centroid Data

Supplemental centroid analysis for 009450669-07. Kepler magnitude: 15.44. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

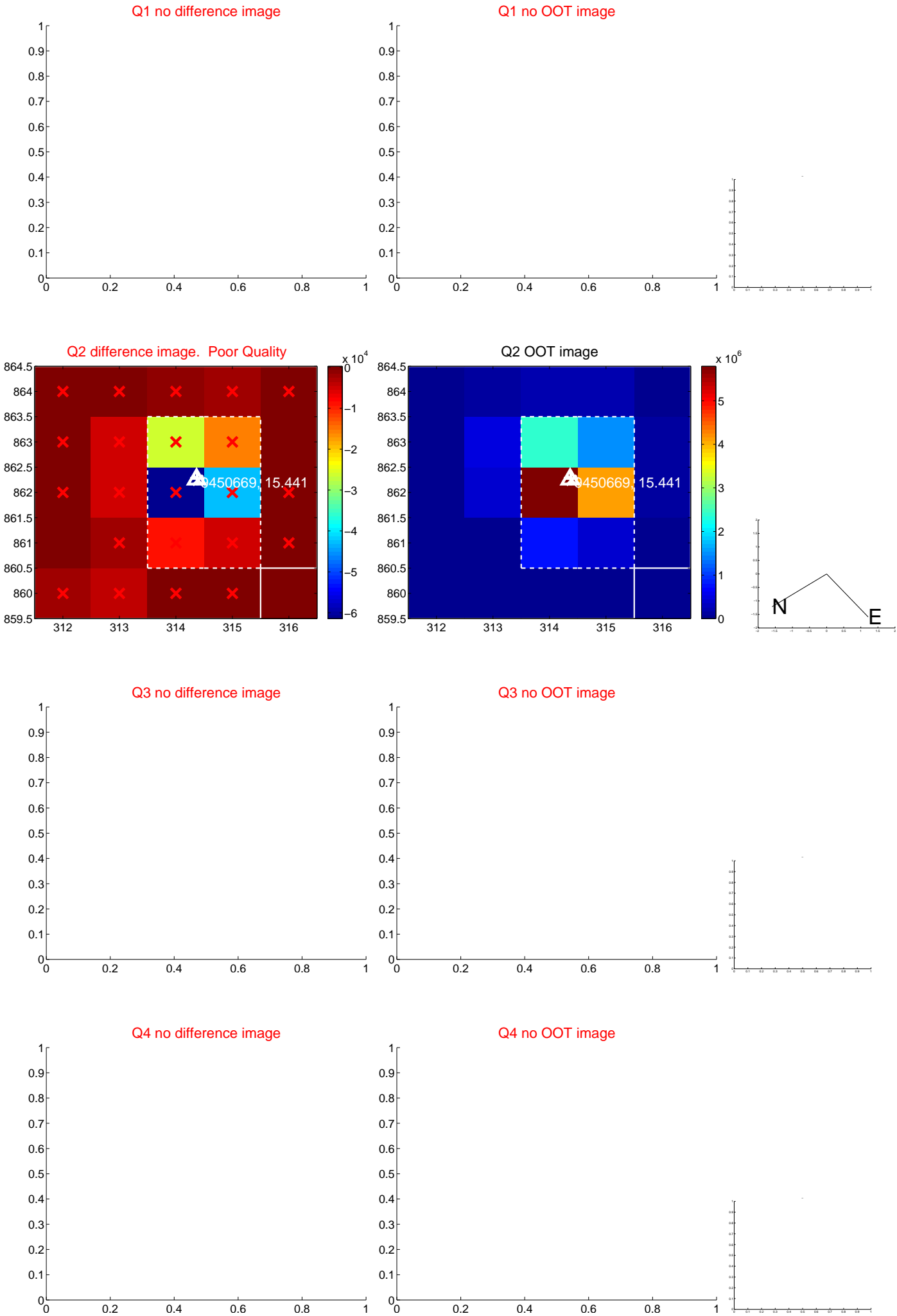
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.063 \pm 0.103$	0.61	$0.056 \pm 0.102$	$0.029 \pm 0.106$
PRF-fit source offset from KIC position	$0.059 \pm 0.102$	0.57	$-0.059 \pm 0.102$	$0.001 \pm 0.106$
photometric centroid source offset	$0.05 \pm 0.08$	0.58	$-0.05 \pm 0.08$	$-0.01 \pm 0.10$

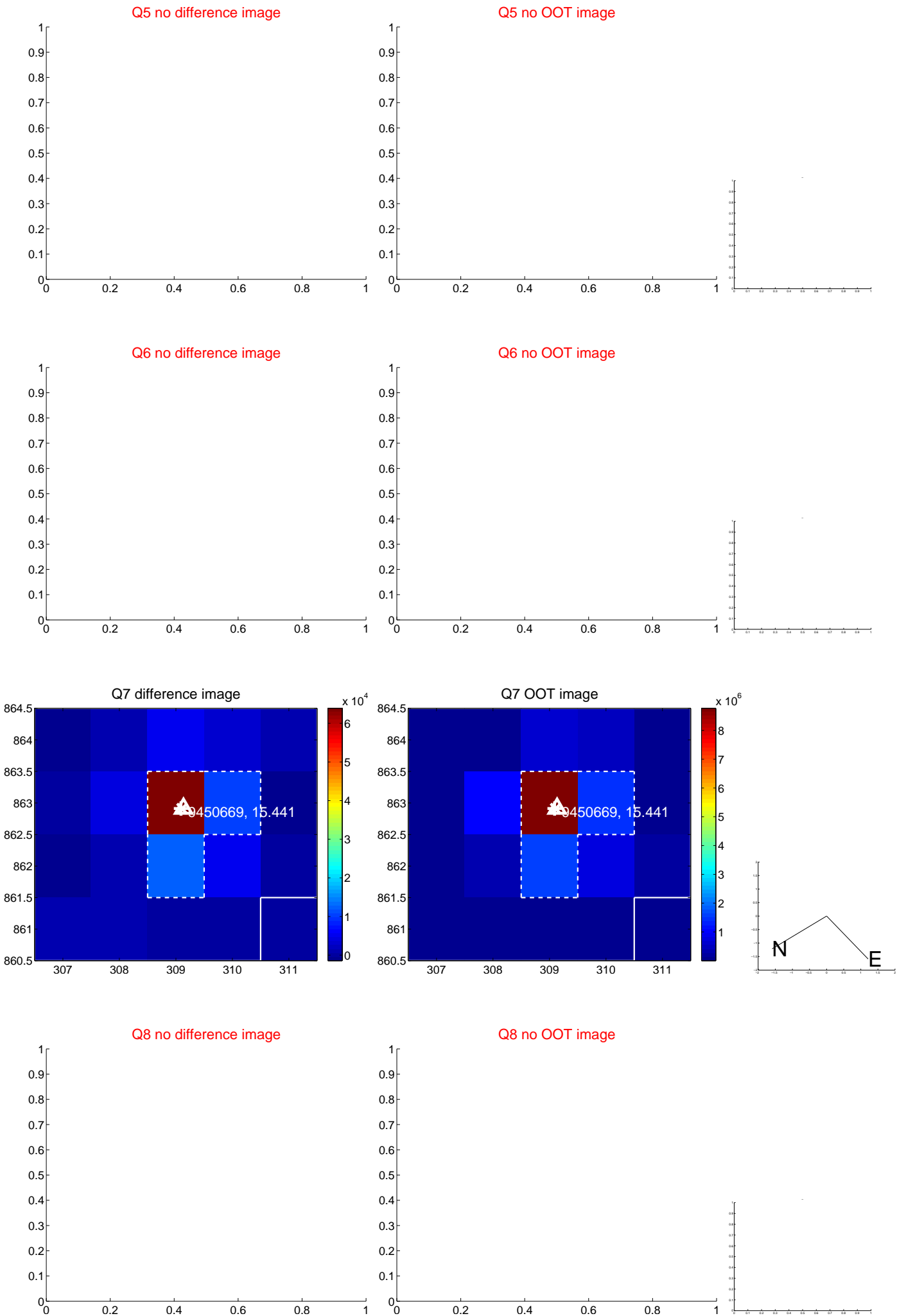


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



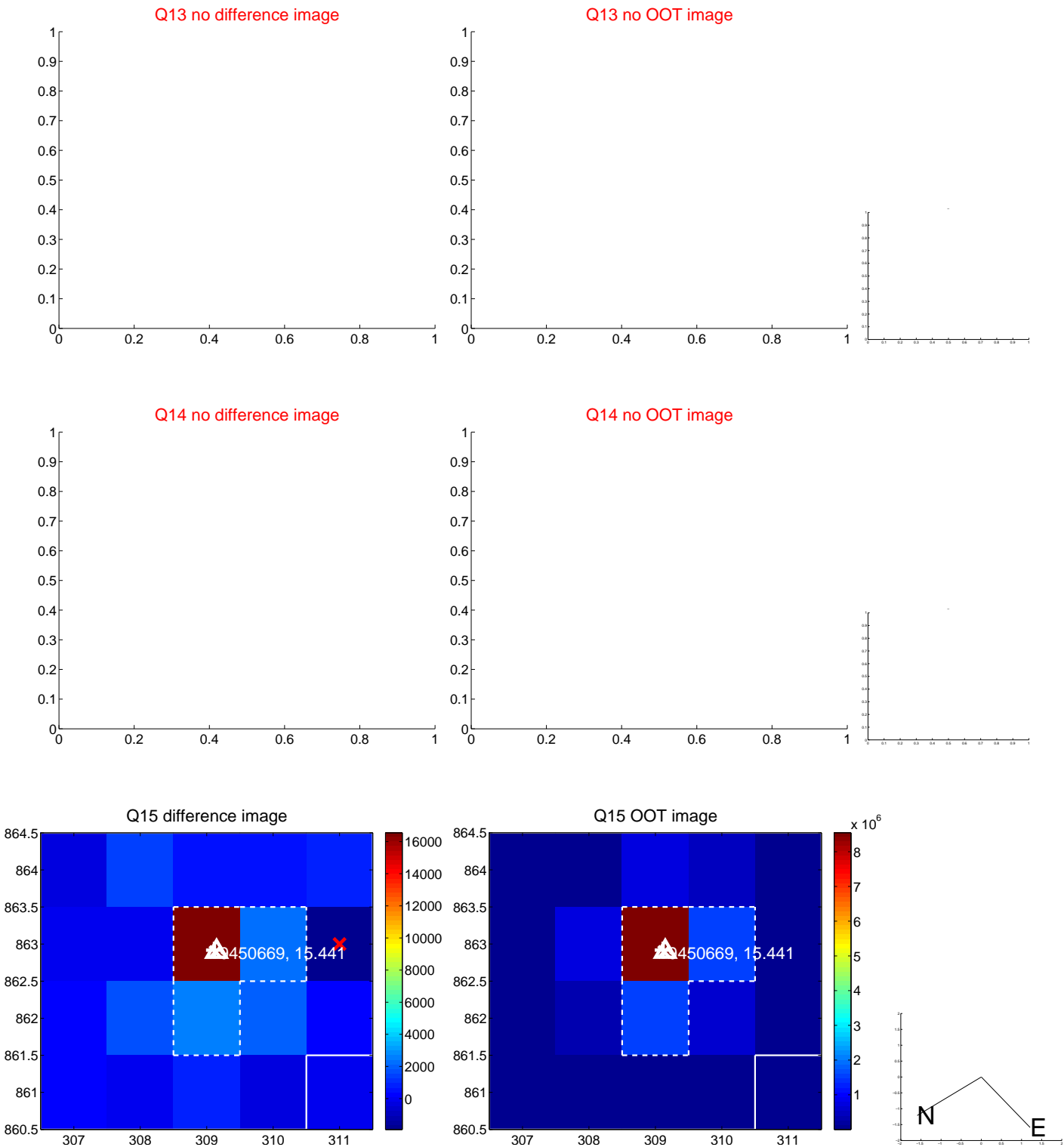
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



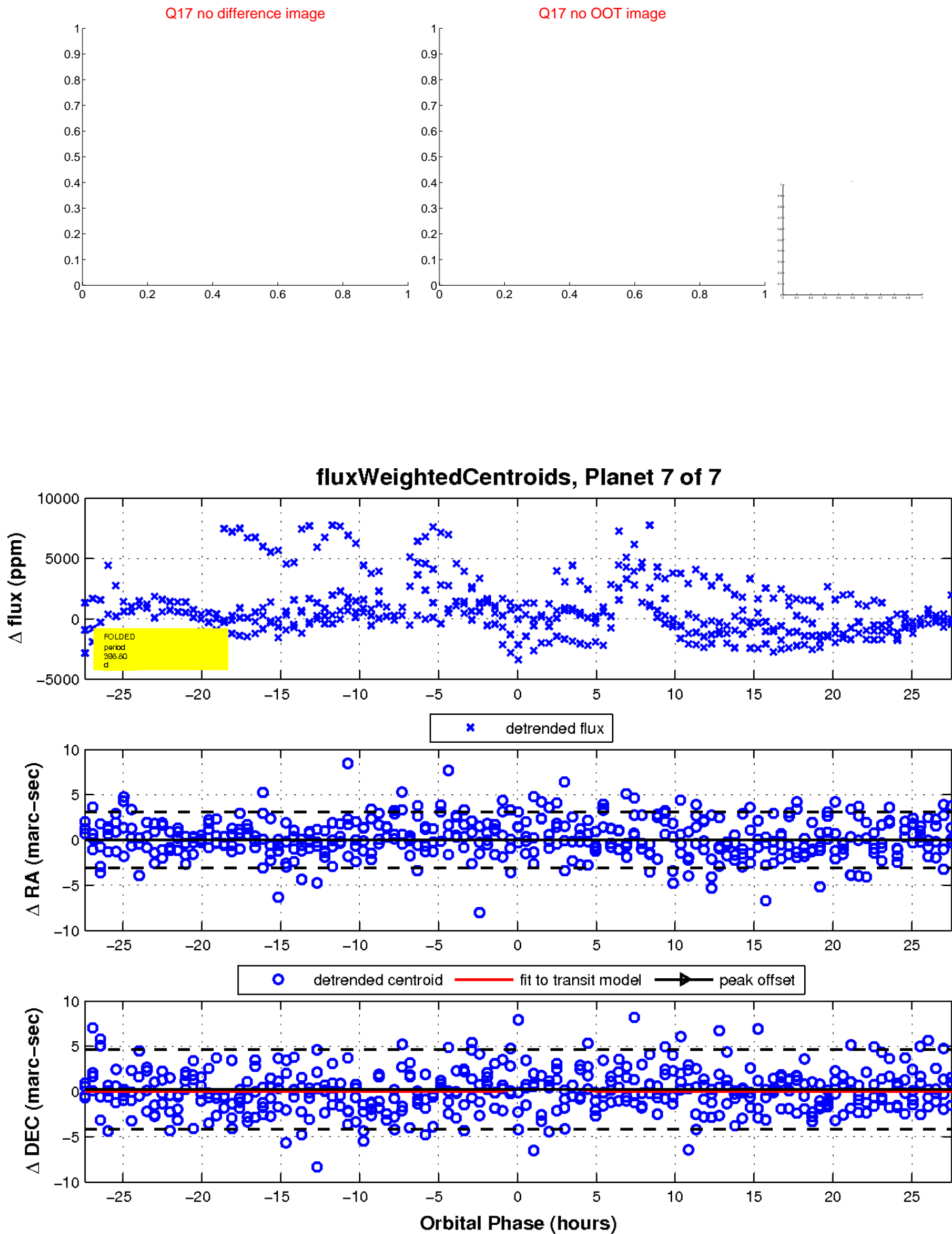
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination

